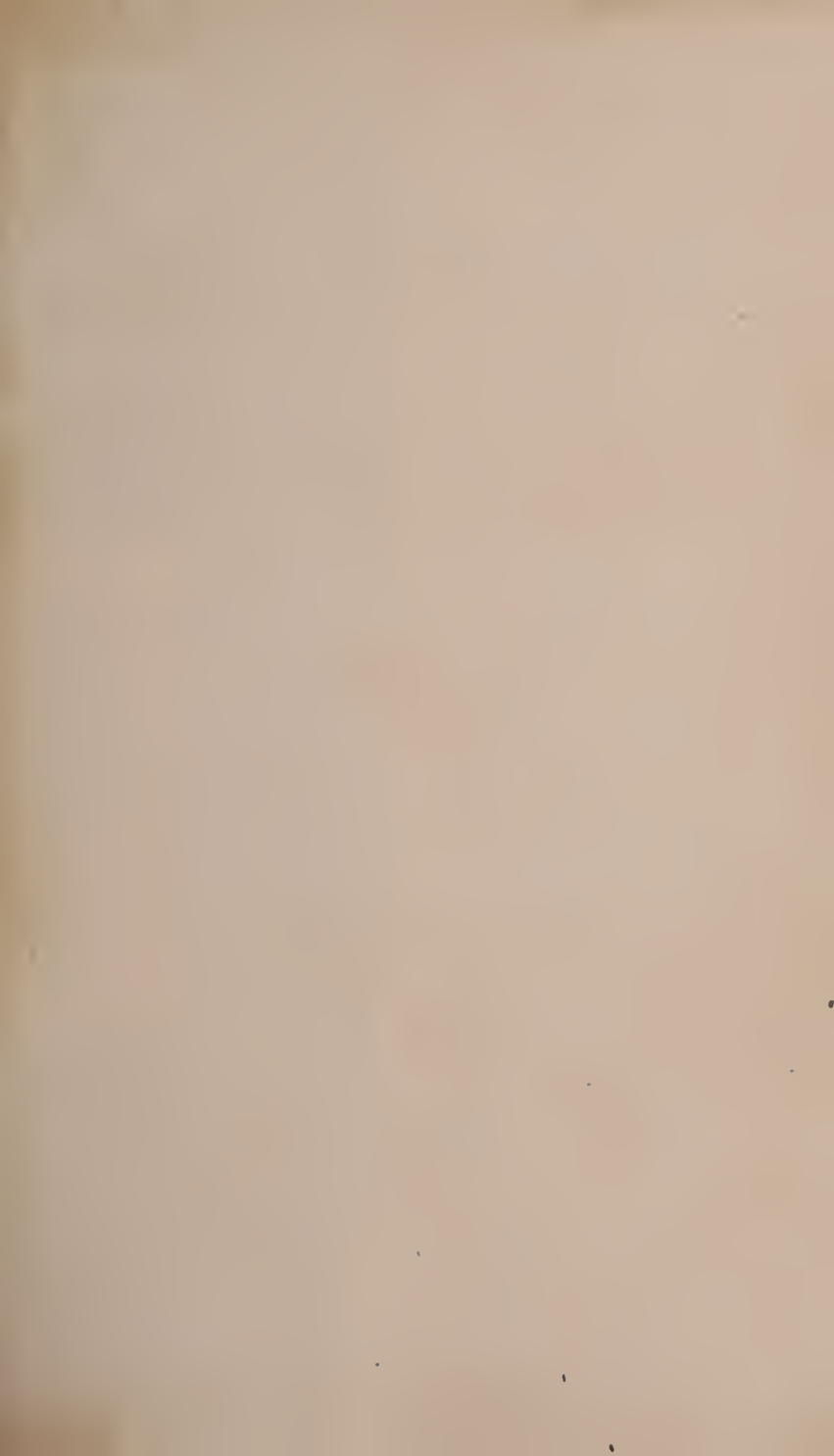
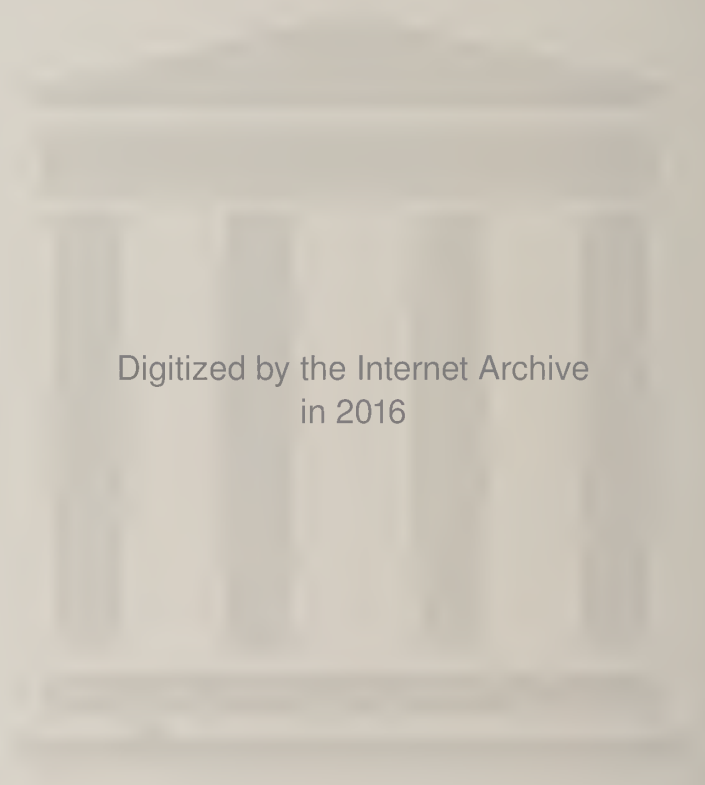


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ART. I.—*Memoir on the Climate, Soil, Produce, and Husbandry of Afghanistan and the neighbouring Countries.*—By Lieut. IRWIN.¹

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### PART II.—OF SOIL.

90. It may appear an easy task to learn the nature of the soil in the various districts, or at least the more ostensible properties, such as colour and consistency, but in practice many disappointments will be experienced. Informants are apt to impose upon the inquirer their own petty experience, for the general truth of things; on few subjects is local vanity found so strong a vitiating testimony. Moreover, let the testimony be ever so candid, the circumstances of the case present some other difficulties. It is well known that within short distances the nature of the soil is often found to vary in all degrees. Evidence as to a small part of the district is here but little consistent with respect to the whole, and it requires a large induction (which may not always be procurable) to establish generalization; and vegetation. It is on

91. The immediate environs of Delhi are of a sandy soil, though not a mere sand, and generally of a yellow colour. In the northern road to Lodhiana after a few stages the soil becomes more and more loamy and black. The soil of Paneeput is a fine sandy loam. At Umbala, which lies on the left of the Kughur, the soil is a deep loam or mud, of a dark brown colour and great strength. Kughur and Sursootee running in a muddy soil are narrow and deep, and hence a slight fall of rain makes them impassable. The Markunda, which the traveller crosses between Shadeepoor and Lundee, before he reaches the Sursootee, ultimately falls into that stream; it runs in sand, and is shallow and broad. At Sirhind and as far as Lodhiana the soil has a greater proportion of sand than on the banks of the Kughur. The soil of the country of Bhutner is various. The cultivated parts are loam or sandy loam; some of the pastures contain tracts of sand hills, and others of level hard clay. Under the great northern hills the soil has a great proportion of mud, of a rich quality and much natural moisture. In the road between Delhi and Lodhiana, water in wells is found at moderate depths, but to the left hand, in Hureeana and Bhutner, we come to places where the wells are of considerable depth.

92. In the Dooab or country lying between the Sutluj and Beah, we find the soil to possess considerable variety, but on the whole it may be described as a sandy loam of excellent quality, very little elevated above the surface of the rivers, and the wells are consequently shallow. The Beah runs in sand, and sweeps away in its waters sand of a yellow colour; the Sutluj in the rainy season is more turbid and muddy. The right bank of the Beah is high and sandy, and there seems to be a gradual descent thence to the Ravee. The soil of this part of the upper Punjab has a great proportion of sand, but yet has sufficient firmness.

The Dooabs have a less proportion of sand, yet little

In some places tracts occur which are naturally

Punjab, the greater elevation, though perhaps

great range of hills

ing less sand



stock on the Indus, to Julalpoor on the Hydaspes; it has been already mentioned that some parts of the country to the left, or north-east of that route, are noted for Goitres, a disease occasioned by bad water, (see paragraph 89.) The soil in the greater part of this Dooab and especially Pothwar, is a light yellow sand, which the rains cut into deep ravines in the most irregular and curious manner; every year the existing plain grounds are thus destroyed and new ones formed. Sometimes beneath the sand are seen strata of loose rounded stones, or of silt, stone, and sand, and these layers are sometimes of great thickness. Water in wells is near the surface, but the farmers are not at the expense of digging wells for irrigating their Rubbee crop, putting trust in the winter and spring rains, and the natural richness of their land. Huzara and Pukhlee have good soils of various kinds, but yet inferior to Chhuchh; they have however greater command of water for irrigation. The soil of Kushmeer is generally loam, and in colour black or dark brown. The district of Pamper, in which alone saffron is produced, is a red clayey loam. The soil of Mushmeer and the nearest hills around it, is remarkably free from stones. The Hydaspes when low, is sea-green and turbid, its waters on reaching the Punjab are of a deep coffee colour. Its alluvial matter is loam, not that of the Indus sand.

94. We return to Delhi to detail the nature of the soil in the Embassy's route thence to Peshawur. It becomes more and more sandy from Delhi to Rewaree and Kanour. The wells are of considerable depth, and the water often brackish. The country of the Shekhawuts, which next succeeds, is superior in all these respects, and the fields have occasionally a few stones in them derived from the low hills which traverse this tract. Leaving it we enter a sandy plain, generally abounding with sand hills. The depth of the wells increases at every stage till we reach Beekaneer, where it amounts to 264 feet. The water is sometimes good and sometimes brackish in various degrees. That of Mathoor is peculiarly bad. Beyond Beekaneer the desert is commonly considered as beginning. To twelve miles beyond Poogul, or sixty-seven miles from Beekaneer, the same soil continues; but the sand hills are higher than before. Next commences a level hard smooth clay; this is locally called *Chitrang*, and it is only in such tracts that the traveller imagines he sees lakes and rivers before him. To the western edge of the desert is eighty-three miles more, and about half of this distance is clay, the other half sand, which appears to have been nearly blown over the clay. From Beekaneer the depth of the wells gradually decreases. The soil of the desert, generally considered, is not inferior

to that of Beekaneer, and where the sand and the clay are mixed in due proportions, is of an excellent quality. It is therefore neither the badness of the soil, nor the depth of the wells, as commonly imagined, that causes the desert to be so thinly peopled, neither is its water worse than that of the tracts to the eastward. There are several reasons to think it was in former times better inhabited. It is unquestionably for the interest of the British Government, that it should be utterly uninhabited and impassable; a little address and a moderate expense could effect this object even with a due regard to the rights of the present inhabitants.

95. The edge of the desert at Buhawulpoor is only three miles from the left bank of the Ghara, and the space between them from the north-west point of Sadik Khan's dominions to where the Ghara is lost in the Chunab (see paragraph 32) is seldom much more than double this distance. This narrow tract is of a soil not to be surpassed in fertility. When dry its surface has a degree of whitishness perhaps originating from a mixture of chalk; when watered it appears black. It is deep and friable, and may be called a clayey loam or mud. The Ghara when low has a whitish colour, and its water is very good. Its bed abounds in quicksands, having that mixture of fine sand and mud which seems calculated to form them. The rivers in general of the Punjab as well as the Indus have quicksands. Beyond the Ghara, or the road to Mooltan, is a tract of sandy ground, in which the wells are deeper and some of the plants and other appearances of the great desert occur, from which in fact it seems to have been cut off by the Ghara. It extends at most but two or three days to right and left of the road travelled by the Embassy; and gradually melts into the more fertile country which surrounds it. It seems to rest on clay, and the soil of Mooltan has a great proportion of clay; many of the fields give evidence of salt, and in general the soil is inferior to that of Buhawulpoor.

96. In the further progress of the Embassy from Mooltan to the commencement of the hills beyond the Indus at Punecala, the basis of the country appears still to have been clay, though in some cases the uppermost stratum be sand. At three and a half miles from the left bank of the Chunab begins the Thul of Mohummud Khan already mentioned (see paragraph 29;) it is sand of a poor quality, but not uncultivable. It is broadest to the north, and there too the wells are deepest. In this quarter is situated Munkeera, the chief fort of Mohummud Khan, which is thought to be secure less by the strength of its own works, than the barrenness of its neighbourhood, and the scarcity and badness of the water. In the route of the Embassy the wells were



moderate depth, but the water sometimes brackish. Towards the Indus the quality of the soil and water improves, but the country is still sandy. Mukulwad, on the other hand, beyond the Indus, is a stiff and hard clay of an ashy colour; in process of time it may assume a different character. On the one hand the Indus is continually encroaching on it, and washing it away. Where that river has mixed its sand with the original clay, the quality of the soil is plainly improved. On the other hand, towards the Daman and the hills, are considerable tracts of sand incumbent on the clay, and impregnated with salt; the rains annually bring down more sand and spread it on the clay. The original soil on the right of the Indus, even as far as Shikarpoor appears to have been clay, and clay is even now predominant; but towards the river a portion of sand has been introduced from its waters; and towards the hills sand or stones, or both, have been washed down by the rains. South-west of Dera Ghazee Khan, which is the capital of upper Sindh (see paragraph 25) on the road to Seeweestan, are the sands of Dajul, which if extensive would constitute a desert. Largee, (see paragraph 14) is sandy and unproductive. The plain of Eesa Khel is a clay or clayey loam of the best quality; it is of a dark red colour; its breadth is inconsiderable, and the Indus is daily diminishing it. The same changes in short are here operating as in Mukulwad, for here also we find a tract of barren and saline sands under the hills. The water of the Koorm after rain is of a bright red colour, and it deposits a loam of good quality. The district of Bunnoo is sandy, or a sandy loam. In the country of the Murwuts, which lies to the right of that river, and south-east of Bunnoo, are some tracts of sands very similar to those already mentioned; such also occur between Bunnoo and the districts of Malgeen and Kohat. These districts however have as yet received but little injury, from their neighbourhood possessing an excellent soil, which may be called a clayey loam. The colour in Kohat is black or grey, but in Malgeen red.

97. The original soil, and that which still predominates in the plains of Peshawur and Bajour is a clayey loam; there are now however several exceptions deserving of notice. Opposite to Chhuchh is the plain of the Mundeers, or lower Yoosufzyes, the soil of which is of the same kind and quality with that of Chhuchh. On the other side of the Cabul river the Khutuks possess the south-eastern corner of the plain of Peshawur, which is light, often stony, and of indifferent quality; more to the west, but still under the hills, are Oormul and some other places in which the soil is sandy and naturally poor. The Mihmund's lands are generally a clayey loam; and the Khuleel's

have a still greater proportion of clay. The colour of the soil is various ; it requires much water and much stirring, but when properly treated bears heavier crops than most lands in our provinces. Bajour is of a like nature. The lands of the Mihmudzyes and Daoodzyes have had introduced into them by alluvion a considerable proportion of sand. The latter are thirsty, and bear but ordinary crops. Swad and Punjkora has each its river, and are less clayey than Bajour. The Gugecanee lands are clayey, but such as are near the Ootmar Khel and upper Mehmund hills have a mixture of stone. The Khuleels have the firmest soil, the clay extending to a great depth and water being at a considerable distance from the surface : hence this tribe have dug many underground dwellings, in which to take refuge during the heat of midsummer, and they are not subject to fall in like those made in other parts of the plain.

98. Teera has a stony soil, which generally contains a considerable proportion of sand. Koonur and Lughman are loams of good quality, and very well watered, and productive in rice. The former because of its wideness requires a greater quantity of water for irrigation than Bajour. Jellalabad is a sandy and thirsty soil. Under its hills (the range of  $34^{\circ}$ ) there extends on the left hand of the traveller to Cabul a barren tract, in length about forty-five miles from Busawul to Nimla ; and in average breadth about five or six. It is partly stony and partly sandy. Perpetual winds here prevailing, it is thought that these sands are encroaching on the good lands. The present soil of Jellalabad has probably been transported from them by the winds. The lands of the upper Mihmunds are of very various kinds. Kama is clayey and moist, Goshta is inclined to sandy.

99. We find considerable variety in the soil of Cabul. The greater part is a loam with a great proportion of clay, but stones, gravel, and sand, have been lodged under the hills by the rains. On the left hand of the traveller as he goes to Ghorbund from Cabul, is a sandy tract under the hills. It is about eleven miles long by four broad, and quite uncultivated. This is the Reg-ruwan of which many fabulous stories are told by Aboofuzl and others. The gardens and grounds used for raising vegetables in the vicinity of Cabul, have, by long care and culture been cleared of stones, and now have a black, fertile vegetable soil, from nine to twelve inches deep. In general the lands in this valley bear heavier crops of all things proper for the climate than those of the plain of Peshawur ; but this is partly attributable to the plentiful manure and assiduous culture they receive. Draw-wells are but little used, as water is near to the surface ; but the water of draw-

Wells in the city of Cabul is acknowledged to be bad. The neighbourhood of Ghuznee has a light soil, with a mixture of small stones. Some other parts of the table land are stiffer, as having more clay in their composition. A mixture of stones in the cultivated fields is universal, and indeed considerable tracts of the table land are so covered with small stones, as to yield but little, even in pasturage. The north has a good deal of broken ground; the south is more level. With respect to the lands of the Huzaras, they are of no one kind except that they are generally stony.

100. Mookr and Abitazee, on the road from Ghuznee to Candahar, have light soils with a mixture of small stones. The Dooranee country generally considered must be pronounced sandy. Near Candahar the soil is sandy and thirsty, but facilities exist for irrigation. In the city of Candahar water in draw-wells is near the surface, and of good quality, and few places can be named in the whole of Khoorasan where the water is bad. In general the inhabitants drink from running streams, but draw-wells are not unknown, especially within cities and in the desert places frequented only by shepherds. Between Hirat and the Persian Khoorasan there is a sterile tract, which forms an imperfect barrier. The Regimulikan would be crossed in the direct road from Jellalabad, the capital of Seestan, to Furah, and is of considerable extent. South of Soorbut the traveller crosses a desert tract forty miles broad, on the road to Goonabad and Ghaeen. In Seestan, especially the west, there are considerable expanses of sand, generally without fixed inhabitants, and sometimes without water. Between Jellalabad and Kilat of the Beeloches, the country is supposed to be generally a desert. The various desert or sterile spaces now mentioned, appear to me to have an imperfect communication with one another, and therefore do not constitute a military barrier; nay, we perhaps over-rate the difficulties they would throw in the way of the disposition and passage of troops. By digging draw-wells an enterprising and ingenious enemy would find water at a less depth in the earth than is commonly imagined.

101. Zumindawur is situated, as already mentioned, on the right of the Helbund, (see paragraph 56.) Its soil is more loamy than that of most other parts of the Dooranee country, and is of a good quality. Northwest of it is the country called Seahbund, situated within the Parapanisan mountains, and inhabited by the Tymunus, a tribe of Ymaks: part of it has a clayey soil. The Gurmseer lies south and south-west of Zumindawur. Its soil, which is naturally sandy and weak, is rendered productive by water drawn from the Helbund. The Joolgha

or plain of Hirat is a sandy loam naturally fertile, and being well watered bears good crops. The same species of soil extends to Murv, and beyond it, although the intermediate space be little cultivated. The soil of Murv is esteemed very good ; that of the Jumsheedee tribe, whose territory forms the north-east corner of Khoorasan (see para. 19, 27,) is perhaps equally good, and the Ymak vallies are in general fertile. In the Jumsheedee country, and also in Jam and Toorbut, is a great deal of broken ground. There is a less proportion of this in the country of Ghaeen, and Birjund, and in Zumindawur, but still it is considerable. Ekatool, belonging to the Ulukhoo-Zyes, a tribe of Dooranees, is remarkable for the quantity of its ravines and broken ground. Sungoo a city of Khaf has a hard clayey soil. The soil of Mushhud is good and productive. To the north we soon reach the desert of Margiana, which is generally a sandy plain, but contains some low hills or hillocks. To the east it approaches near to Muno, and north of that place joins the sands lying between Bactria and the Oxus (see paragraph 104.)

102. The great desert called Loot, lies south and west of Seestan, and divides Seestan and Khoorasan from the Persian province of Kirman. It undoubtedly communicates with deserts in the west of Bulochishtan, or those deserts form a part of it. It is throughout a sand, probably quite uncultivable, and the edges only are visited by the pasturing tribes. It is crossed by caravans, and sometimes by small parties of marauding horse, but in these quarters those who go on expeditions, generally mount themselves on camels, as being more patient of thirst. Like other deserts its outlines are not easily traced, as it gradually melts into the inhabited country. In the road to Tubus (the westernmost of that name) in Khoorasan, the last inhabited place in the province of Kirman is Durbund, which is forty *fursukhs* from the city of Kirman—at Durbund are some brackish springs ; thence are forty-five *fursukhs* of desert, to Chihlpaya, where are no inhabitants, but a tank containing rain water, and a bowree dug by the order of Nadir Shah. It is reckoned to be 300 feet deep, and the water is brackish. There is here a hill which appears as if overturned by some convulsion of nature ; it has not the least vegetation, and there is little grass or even shrub in this dismal desert. After fifteen *fursukhs* more, we reach Naeebund, where is some good water from springs in hills, and a few resident inhabitants. The country is still sandy and continues so far, several stages towards Tubus, and the population is but small. There is a road east of this road from Nil (see para. 27) to Khubecs, where the chief inhabitants are Ghiljees, who settled



here during the time that the Afghan dynasty ruled Persia. This is even a less practicable road than the other, and in summer is not travelled. There are eight stages of a camel journeying almost incessantly, and no water is to be had in the whole space. This desert then may be pronounced impassable by regular troops, except in the smallest bodies.

103. Our knowledge is very scanty concerning Bulochistan. Its western parts or western boundaries are generally desert, but in some places villages are interspersed. There is a winding road from Kilat to Kirman through Punjgoor, Jalk, Dezuk, and Beinpoor, but various parts of the stages are desolate; the soil even in the route I conceive to be generally sandy; the fertile spots are at the foot of hills, which yield them either by nature or by means of art, a scanty supply of water. The hilly tract on which is situated Kilat is much superior to the preceding, yet even here are several upland wastes in which even water is not to be had for one or two days' journey. The soil of Kilat seems to be generally loamy, but in some places is a stiff clay. Such feeble streams as the Buloch hills yield being soon absorbed in this warm climate, there intervenes a dry space between the hills and the sea-coast, which may be compared to the Tehama of Hejaz and Yemen. In this space Rind tribes wander, whose chief riches are their camels. The soil seems to be most commonly inclined to clay. In Seeweestan, a clay or clayey loam seems to predominate, but Dajul (which perhaps belongs to Sindh) is sandy, and there are other exceptions. In Seeweestan water in draw-wells is deeper under the surface than in Sindh, but yet at no inconvenient distance. In some routes spaces occur, of perhaps forty miles broad, where neither water nor cultivation is to be seen, but there is little reason to think the circumstance owing to the badness of the soil; some were formerly well peopled. There is a tradition that the river Indus taking a bold turn to the right formerly ran through this country, and appearances are said to favor it. The lake or swamp called Manchoor, mentioned by Aboolfuzl, was perhaps a part of the bed of the Indus; it is thought to be in the south-east. Aboolfuzl tells us it is near Seewee, but this I conceive erroneous. There are some low and moist lands in Seeweestan, which perhaps were also parts of the Indus bed. There is reason to think that from other causes the rest of Bulochistan (and the remark might be extended to other countries) is drier and more barren than in former times.

104. The soil of Bactria from Mymuna to Talikan, has a great proportion of clay in its original composition; at present this is most

visible in those parts which are neither near to the hills nor the Oxus; for towards the former, the matter brought down by the rains has often changed the soil to stony, gritty, or gravelly, sometimes to sandy; towards the Oxus the soil becomes a loose unfertile sand. The sands begin at Huzrut Iman, and continue to the lake of Aral, their breadth continually increasing. In the space intercepted between Huzrut Iman and the common road from Bulk to Bokhara, through Kilif, the average breadth of these sands, which are nearly waste, is more than thirty miles; the sandy tract opposite, on the right of the river, is not so broad. The soil of Bulk is a clayey loam, sufficiently friable, and of a good quality. That of Koonduz is very similar, and in colour black. Khoollum, and generally that under the hills is a hard gravelly clay. Talikan is a loam inclining to clay, of a good quality. Undkho has a good deal of sand, but Mymuna is a strong clay, and abounds in ravines and broken ground. About half way between Undkho and Mymuna the traveller begins to see numerous hillocks in the plain, and they continue as far as Muro, and almost to Hirat. They are composed of a good soil, without stone, and bear good grass; they are sometimes under crop, but the chief cultivation in this space is near the moist banks of streams constant or temporary. Budukhshan has a stony soil, but otherwise it is very various in consistency, colour, and excellence. Fyzabad is a sandy loam of a reddish colour, as is found in many other places. Durwaz, and the Shooghnan and Wukhan vallies have a blackish soil. The same observations are probably as applicable to Wukecha and Keerategin as to Budukhshan.

105. The west of Toorkistan is sandy, and without artificial watering yields poor crops; hence the chief cultivation is near the banks of rivers and streams. Between Kilat and Bokhara the water of wells is usually brackish, but is found at moderate depths. The hillocks near this road are of sand, not of a good soil as those of Bactria. To the west of Bokhara is the Kurakol, an uncultivated space which extends to the lake of Aral; but it is not considered as crossing to the left of the Oxus, where begins the great desert of Margiana, so called by the ancients. The principality of Khwaruzm is thus encircled by deserts. It is however to be remarked, that the Toorkmuns who live on the edge of the river, generally avail themselves of the facilities it affords for irrigation in its flood season, and raise some crops on the low grounds near it. Water is here so near the surface, that the inhabitants often dig wells, where they pitch their tents, to serve for their use during the time they may halt. In the interior of the deserts there are wells, which have



been dug by the governments of former times; these are never remarkably deep in the Kurakol, but the water is at least as good as that of draw-wells in the neighbourhood of Bokhara. The soil too is seldom impregnated with salt, and were it the custom of the country to water lands from wells, it could be brought into cultivation. At present it affords an early grass to be pastured in the spring. That part which is next to Bokhara, was formerly cultivated. The Kurakol extends beyond the Jaxartes into the country of the Kuzzaks, but that people have also hills and declivities with a good soil. With respect to the Kirghiz country, and the east of Toorkistan, the soil has considerable variety; many places are stony; loam and clay are very common, and in natural fertility the cultivated lands of the east are unquestionably superior to those of the west. The Pamer has a rich soil.

106. In the vast extent of Chinese Toorkistan it may be supposed there is to be found all varieties of soil. That of Yarkund is sandy and weak, and sandy wastes intervene between it and Khootun, in which the Chinese Government have erected pillars to guide the travellers into the right road. The uncultivated space is about an hundred miles broad, if we pursue the ordinary road. The soil of Khootun is superior to that of Yarkund, and the cultivation considerable. The river of Yarkund passes through this country. To the north-east sands soon recommence, in which the river is at length lost, at no great distance from Toorfan. Ela and Aksoo lie near to mountains in northerly directions, are tolerably well watered, and the soil is good. Akeoo seems to be north and a little east from Yarkund, and the road is sometimes inhabited, sometimes not.

107. There remain some countries of which we have little information which can throw light on the present subject. Such are the Tibets and Kushkar. We know that they are ill cultivated, and perhaps the climate condemns great part of them to sterility. Other parts may be occupied by rocks and stones. From the particulars now detailed, it is evident that the countries most favoured by nature, are neither the upland tracts nor yet the open plains distant from hills, but those which lie at a moderate distance from their foot, and receive the water which flows from them. Lofty mountains however barren themselves, are the cause of fertility to the plains below. In the vast expanse here treated of, there is a very great proportion now uncultivated, and may continue so for ever. Some part is a loose sand or hard clay, unproductive without much water, which at the same time the climate and situation deny; another is covered with a profusion of stones. The composition of some lands seems adverse to the growth

of useful vegetables. The commonest species of this kind is saline land, which occurs at intervals in almost all the various districts which have been mentioned. A mere sand and a very hard clay seldom give evidence of this quality, which is thus found in soils otherwise of the best composition. Chhuchh, the lands of the Mundurs, and those of the Huzaras, are remarkably free from it. A certain degree of it is by no means inconsistent with fertility, nay, the natives of the west of Khoorasan, prefer land moderately saline for the raising of melons and cucumbers: some remarkable saline spots are mentioned under the subject, which next follows, (see paragraph 112.)

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### PART III.—OF NATURAL HISTORY.

#### SECTION I.—Of Minerals.

108. The Persian metals are not found in these countries in great abundance. Most of the streams which rise in the great northern range, or in that branch of it which forms Kafiristan, and also those streams which arise in the Belur, wash down grains of gold which the natives take pains in collecting, but it is not supposed that this business is very profitable. In some parts of the south-east of the Huzara country, grains of gold are also found. With respect to silver, if we except a little found in the country of the Kafirs, it is produced no where but in the Chinese dominions, and I am not sure whether it be in their ancient territories or their new acquisition of Chinese Toorkistan. Copper seems to have been formerly found in the district called Sealbund (see paragraph 101) and according to some it is produced not far from Nishaboar, which is in the Persian Khoorasan. The same hill which yields it, is said to yield iron and lead; but according to others, lead is the only metal produced. Between Furah and Ghaeen, is Tubus, called *Miseen* from its copper mines, and to distinguish it from another Tubus, far to the west, commonly called Gil Tubus. At present both are under the Persians. Indications of copper are to be seen in the Bajour territory. In the kingdom of Bokhara, is a town called Sherabad, about seven days south-east of Bokhara, and about two days north of Sherabad is a hill called after it which produces copper, not wrought, and also verdigris, which is an oxyde of copper. With respect to precious stones, the ruby mines of Budukhshan, once so famous in the whole world are no longer wrought. We are told that in the south-eastern parts of that country

re whole rocks of *lapis lazuli*. Nishaboor is still famous for its turquoise, which are found in a hill in its neighbourhood, that yields no other mineral product. Major Welford has mentioned lapis azuli, hyacinths, crystal, bajor, stones of a superior quality, and marbles of various colours, being found not far from the banks of the Indus, before its junction with the Cabul river, (see his paper on Mount Caucasus in the sixth volume of the Asiatic Researches) I scarcely remember to have heard of these things, but as that author's information is generally very correct on points of geography and statistics, I presume there is much truth in the account.

109. Aboolfuzl has mentioned an iron mine at Khiroo in Kushmeer, and it is still wrought, being perhaps the only mineral of any note to be found in the valley. There are numerous mines of iron near Kanee Goorm of the Wuzerees, which lies to the north of the range of  $32\frac{1}{2}^{\circ}$ , towards its termination to the eastward. Iron is found near Burawul, and Burwa of the Turkoolnees, and also above Deer of the Yoosufzyes, lying in Punjkora. In all it is gathered in the state of coarse sand or gravel. An iron mine was formerly wrought near Dhukha of the upper Milmunds. Near Cimnan, a city of Khoorasan, on the frontiers of Irak, iron is produced, and also in a hill four days south of Ghaeen. The existence of iron in the territory of Nishaboor is disputed; an ore of this metal is found in a hill of Chhuchh or Huzara, six miles west of Hussun Abdal. In Toorkistan there are very numerous mines of iron. In the territory of Kokum may be two, in that of Bokhara one, in that of Hisar two. Shuhursubz has one mine, the territory of Tashkund one, perhaps more. It is said Keerategin and Durwaz have none. In the territory of Fyzabad there are four mines; and in the small principality of Kolab, the greater part of which lies on this side the Oxus, between Keerategin and Fyzabad, there is one. Bulkha has one mine in its hill to the south, and Tolekan another. Notwithstanding the number of iron mines in Toorkistan, that metal is imported from Russia, and is of a superior quality.

110. Lead is very abundant in many parts of these countries. Not unfrequently it is found in the same matrix with soorma, which is an ore of antimony;\* sometimes it is found alone, as soorma also is. I have heard of the following mines of joint lead and soorma, viz. two in the country of the Afreedus, one at Khakshista of the Huzaras, south of Bameean, one or two near the source of the Urghundal, two

\* I am now (January 1811) assured there is also sold under the name of soorma a certain sulphate of lead, and it is natural to suppose, this is the substance here meant.

at least in Chitral, and one in the dominions of Kokur. One mine of lead is found in upper Bungush. In the country of the Shinwarees who are west of the Afreedus, one mine. There are two mines in the country of the Kokurs, and one at Turbulakh of the Dehzungee Huzaras, who are the most westerly of all. Near Baghis of the Ty-munees within the Ymak hills, the spring torrents bring down pieces of this metal. I have not heard of its being found in any other place of Khoorasan, except near Nishaboar. In Toorkistan it is very abundant. There is one mine in the hills near Bulk; in the principality of Talikan there seem to be two mines. In the district of Undurab there is one mine, and in that of Khoost another. Lead is also found in Khirjan, which lies between Khoollum and Bameean. In Budukhshan lead is abundant, and there are three or four mines in the valley of Wunj. Some lead is also brought through this country from Kashkar and the borders of the Kafirs. Kolab has two mines, Buljeewan, which is under the lesser Kolab and is beyond the Oxus, has one, and in the territory of Hisar are two. Nooruta has one mine, and there is perhaps another in the dominions of Kokun, and one or two in those of Tashkund. There is one mine in Keerategin, probably more. Soorma without lead is found in the principality of Talikan, in several places, and is said to be abundant in Budukhshan, Durwaz, and Keerategin. Soorma is found in the country of the Besoot Huzaras, who are among the most easterly of that nation. A mineral called white soorma, is found near Dubran, which lies north of Huzara.

111. Orpiment, which is yellow oxyde of arsenic, is found near Sakhir in Seahbund, and in more than one place in the hills of Bulk. It is also produced somewhere in Budukhshan, near Lungreeal, which is not far from Dubran; it is the ore of some metal of a whitish colour and a consistence which adapts it to be easily made into bullets. Towards Cabul and in many other places, the villagers use a certain species of gravel, called *sungisachma*, for shot. The most famous place for sulphur is Gogirduk, between Khoollum and Bulk, but this mineral is said to be found in some other places of Bactria, to the east of Bulk. Some is produced in the territory of the greater Kolab, and some in that of Fyzabad. Sulphur is reported to be found in the hill of Sherabad (see paragraph 188.) It abounds in Chitral, and some other parts of Kashkar, and some of it is in an oxydized state. Some is to be seen in the desert of Margiana (see paragraph 101.) There are two mines in Seewcestan, of which one is near Bhag, and one not far from Sunnee. The western Tubus is famous for its sulphur, as well as its tobacco. Some of the springs of the Kafirs



well of sulphur. In these countries are many warm or even hot springs which could be named. The other natural curiosities known to the natives do not deserve much mention, especially as the circumstances of some seem fabulous.

112. The supply of common salt is from various sources; rock salt, that of salt ponds, that of springs, and that made from the soil. A minor range of hills has been already distinguished as the Salt range, (see paragraph 12.) Some is found at the beginning of the range in the country of the Oorukzyes, but is of little note beyond the neighbourhood. At Kala Bagh, the hill which overhangs the town, is in a great part composed of salt. Near the termination of the range, this mineral again becomes very abundant, and is found in several places. This is that which in our provinces is called *Lahouree*, as coming to us through Lahour, though all produced beyond the Hydaspes. It is of a dingy colour, whereas that of Kala Bagh, which is superior, is either so white as to be pellucid, or tinged with a red colour from the clay contiguous to it. The north is supplied from these mines, whose produce is carried even into Kashkar, where it fetches a high price, because of the natural difficulties of transporting it. It is rather heavily taxed, in Kushmeer which makes it dear. When the governor rebels, which has often happened, and trade is checked by the existence of hostilities, the dearth is still greater, in so much, that the Kushmeerees having no interval supply, have been reduced to eat red ants as a substitute. In the south of the kingdom, the demand for rock salt is not great. Some is indeed carried from Kala Bagh, as far as the lowest parts of Sindh, but this traffic bears no proportion to the riches and population of that country, and indeed seems an appendage to that in the transporting of pilgrims, who intend visiting the holy city of Mecca. The boats are sold on their arrival with what cargo they may contain, and few if any again ascend the river as far as Kala Bagh. In all parts of Bulochistan, soil salt is that chiefly used, and each neighbourhood makes it for itself. Even the Mooltanees consume more of this kind, pretending that the other is unwholesome. Candahar is partly supplied with salt from that made by boiling the water of a spring at Kushkinukhood, 40 miles on the road to Hirat, and partly from the soil; the latter is reckoned inferior. The chief resource of the west or rather middle parts of Khoorasan, is probably in salt ponds, in two different places of the country of Ghaeen. An ice-like crust is formed at the edges, when the water begins to recede in the dry season, and no further preparation is required. Besides the salt well in the Loot desert already mentioned, there is one about

40 miles south of Toorbut, and another in the road between Toon and Yezd, but none of these are of any use. Near Ubasabad, which is ten days from Mushhud, on the road to Tuhiran, is a hill which gives out two feeble salt springs, which make two bogs, and to procure salt pits are dug at the edges and filled with the brine; this gradually evaporates, and is covered with a saline crust.

It is probable, many lesser ponds and bogs of this nature exist especially in the level countries. Bokhara and Noorūta chiefly consume salt brought from places in the Kurakol (see paragraph 105.) Jizzukl has a mine of rock salt, and also salt from the plain. Samarkand is said to have one mine, Oratepa another. All the three are under Bokhara. Oorgung, Mura, and Mymuna chiefly use salt found in their own plains, sometimes artificially prepared, sometimes not. The kingdom of Kokur is not destitute of soil salt, but has besides at least four mines of rock salt. Tashkund has one, probably more, and also receives salt from the plains to the west towards the Kuzzaks. We know of two mines in Keerategin, one in Buljeewan, two in the greater Kolab, and the valley of Wakhan has rock salt, but the southern part of Budukhshan in which is situated Fyzabad, seems to have but one mine, and its produce is very bad. The eastern part of Bactria, on the other hand, is abundantly supplied, having at least five mines, and Duroona beyond the Oxus has one. One mine of Shulisubz yields salt of a very fine quality, which is carried as far as Bulkh and Bokhara for the use of the rich. Hisar has a salt spring, and two mines very little worked exist in its dominion. Bulkh and Bokhara are partly supplied from springs found between them, partly from a place under the hills, where a crust of salt is produced. Shibirghan has a mine of very good quality, and exports to Bulkh, Undkho, and other places. I have not learnt that any salt is found within the Parapanisan mountains, and such is the scarcity of this article among the Huzaras of the interior, that they do not use it dry but dip their morsels in a brine of it. At one time of the year the poor have none to consume.

113. Saltpetre is no where found in these countries but is made by natives, from the soil in innumerable places. It is a curious fact that the same earth which yields common salt often yields saltpetre also, although both ingredients be different; but dry situations are more favorable to it, and moist to the generation of salt. To complete the list of ingredients used for making gunpowder, it may be observed that no place is much famed for its charcoal. The best is made from the willow, and very good from the plant called uk or nudar (see paragraph 20.)



Borax is dug up near Mushhud in an impure state. A salt called black salt is found in a hill some miles south-west of Kala Bagh. The most famous product of Kala Bagh is its alum, which however is not native, but is prepared from a mixture of pure clay and sulphur, found in the same hill which yields salt. The same exists in small quantities in the quarter where the Lahouree salt is produced.

114. I have made no mention of the minerals of the Tibets, or country north of the Punjab, or those of the Rajpoot country. We know little of the minerals of Chinese Toorkistan, except that coal is burnt at Ela, in that country; and some mistakes have probably been committed in assigning the situations of mines in independent Toorkistan. With respect to the structure and general composition of the hills and mountains, it is needless offering conjectures; the hills seen by us were plainly secondary. Soft and composite rocks appear to be very common in Afghanistan, and hence it is that in a country so mountainous, few houses are built of hewn stone. The valley of Kushmeer is peculiarly destitute of stones proper for building; wood at the same time is cheap and abundant, and therefore the inhabitants erect lofty houses of that material. Good flints are found in many places in the south-east of Bactria, (from whence they are brought to Cabul) in some low hills in the districts of Muro, in those west of Sindh, and doubtless many more. Upper Bungush produces a marble much esteemed.

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## SECTION II.—*Of Vegetables.*

115. The present is a subject on which little is known. What here follows being also very imperfect, it is needless to affect nice divisions, and it is enough if we distinguish plants into three classes; first, grasses and small succulent plants;—second, shrubs;—third, trees.

### *1st. Of Grasses, &c.*

116. It is moisture which chiefly encourages the growth of herbage. Those countries however are not the most verdant in which the greatest quantity of water falls in the year, but those in which there are many days of rain, dew, and mist. The water which falls in low latitudes, does so generally in a short space of time, and with great violence, so that drought prevails during the greater part of the year; hence warm countries are seldom verdant. We should be in error if we supposed that heat, as distinguished from drought, was

hostile to verdure. The season of grass in all countries begins with the renewal of the warm season, unless in circumstances the most peculiar; and even in warm countries the herbage withers at the beginning of winter. Neither are we to decide that warm countries have naturally more grass throughout the year than the cold; for if their summer be dry, the heat of the sun soon withers the pastures, which do not recover until next spring. It is evident therefore that the growth of herbage will be greatest where heat and moisture meet in due proportions. Moisture may arise from the atmosphere or from the soil; and with respect to the moisture of soils, it may arise either from the composition or a low position. It is thus that a clayey loam is better covered with grass than a loose sand or a hard clay; and many districts, the drought of whose climate would leave them little verdure, have abundant grass which is nourished by the water descending from higher situations. A new complexity is added to the subject when the periodical rains fall in the summer, and thus revive the grass which has been withered by the heat in the warm climates.

117. It is found that in India every grass and small plant has its natural seasons of putting forth its new leaves, flowering, casting its seed, and withering. Most of them flourish most in the Kureef, that is after the great rains have begun to fall. Very many however even of these put out new leaves in February and March—soon to be burnt up by the scorching winds; and some of them bear seeds in the Rubbee as well as the Khureef. Some plants naturally flourish in the Rubbee; for example, the Schoon, or wild oat—the seeds of which are shed before the commencement of the great rains, but do not spring up until perhaps the month of October. From what has been said, it is plain that in India there are two seasons of grass—the lesser in spring, and the greater in the great rains, and for a short time after them. The winter months have but little fresh grass, but there is a considerable resource in the withered grass of the Khureef. Between the spring and Khureef grass is an interval in which the pastures are burnt up by the excessive heat and drought; if the soil be very moist, or frequent showers fall, this interval may not be perceptible. It may be supposed to be the same with every country which, like Hindoostan, has a warm climate, and its chief rains in the summer; but when either fails we no longer find these two natural seasons of herbage. When the cold reaches a certain point, the heat of summer is not sufficient to wither the grass after its commencement in the spring, and this is reserved for the cold of winter. The grains of the Rubbee, also, it may be observed, in climates where the winter reaches a certain degree of

length and severity, do not spring up in autumn, but in spring, and ripen in autumn. In warm countries which have no summer rains, the spring grass having once withered, does not recover during the remainder of the year.

118. In the Punjab and Sindh the seasons of grass are the same as in our provinces, and the species are much the same. In the upper Punjab there is perhaps more grass fit for provender than in our upper provinces, but the large kinds used for thatching are scarcer, this however is of little consequence, the inhabitants preferring flat-roofed houses covered with mud, to the thatch so common elsewhere. Hurriana and Bhutner are well known to have abundance of good grass; and the country in general which lies between the Sutluj and the Jumna is more verdant than that on this side of the latter river. The Dooab of the Hydaspes and Indus present the usual varieties. Pothwar has but little grass, except in the bottoms of the ravines. The hilly country of the Gukhurs, and others already mentioned to the north, appear to have much grass, but this does not arise from the great growth but from the small consumption. In the Thul of Mohummud Khan, as in the great desert, we find more shrubs than grass. Mooltan, and upper and middle Sindh, have little grass. The spring of Peshawar is naturally later than in our provinces, and the rains which then fall have an additional tendency to protract the time of fresh grass. The lateness of the summer rains, and their comparative unimportance, makes the Khureef grass later in commencement, and causes it to be little superior to that of the spring grass in this country; it is even said that in Jellalabad the spring grass is of more importance than the Khureef. In Seeweestan though the summer rains are scanty, the Khureef grass is superior to the other kinds; but herbage is not abundant in that province. Peshawar, though its summer rains are deficient, has yet as much grass on an average of all months as our provinces, for showers fall at different times of the year, and the soil is good. The name of Shurhsabz which Tymoor gave it, we may suppose alluded rather to its constant succession of green crops, than the exuberance of its natural vegetation in grass, which is not extraordinary. The least quantity of grass is in the middle of winter and the middle of summer.

119. The seasons of grass in Chhuchh, Huzar, Kohat, Malgeen, Eesakhel, and Bunnoo, are nearly the same as in Peshawar, and the quantity not very different. Mukulwud has but little grass, but some parts of the Daman have a great quantity. The hills called Bedaulut, owe their name to the scantiness of their herbage. The hills of Bajour,

Punjkora, Swad, Bhooner, and Pukhlee, afford abundance of grass in the summer; and the plain of Bajour is even more verdant than that of Peshawar. The grass of Koonur is inferior to that of Bajour, and that of Jellalabad to Koonur, but Lughman is superior to both. Kushmee and the hills which surround it, have a very abundant herbage in summer, but it is not reckoned nutritious; in the winter the sheep and other stock are house-fed—a management probably more judicious than they were kept on the grass remaining under the snow, or were driven to a warmer climate.

120. A great part of the surface of the districts of Cabul and Ghuznee is covered with stones, and the soil is in other respects unfavorable to the growth of grass. The new leaf appears in April and there are but few places, where it is affected by the summer heat, or withers until autumn. If the soil be moist and has been well covered by snow, the grass remains green even during the winter, but makes very little progress in the spring. It may be observed, that the grass of sandy soils appears earlier and also decays sooner than that of other soils. In the winter the sheep of these upper countries are driven to warmer climates to the eastward, and have been known to come as far as Husun Ubdal. It would be difficult to estimate whether the cold or the warm countries here have most grass during the year on a given surface. In the summer, that of the cold is most luxuriant, but in the winter there remains little beyond some withered herbage under the snow; whereas in that season the warmer countries have a certain degree of verdure remaining, especially after a shower, and when the surface is free from snow. The nature of the soil too has an influence, and the upper countries are the less productive of grass, as much of their surface is covered with stones. Cabul is proverbial for a scarcity of fodder, but this does not arise from the nature of the soil, but from there being a great number of horses and other animals, and but little ground for pasturage left uncultivated.

121. Khoorasan has a dry climate, and no summer rains; hence its temperate and warm parts have very little herbage. But Beluchistan has still less, and Seestan is ill supplied. Sheep and goats are seldom kept in the villages, but pasture during all seasons at a moderate distance from them. There are indeed certain parts particularly in the Dooranee country, where the flocks return to the villages after the grass has been burnt up, and are subsisted on straw and other products of agriculture or gardening, with some assistance from the meadows which are not withered by the heat. A considerable part of the Dooranee flocks are driven in summer to the



country of the Ymaks, where they find plentiful pasturage. The Ymaks do not, on the other hand, resort in the winter to the country of the Dooranees, which has less herbage than their own, though warmer, but returning to their *kishlaks*, or winter residences in the vallies, subsist their flocks partly on what grass they can find in good weather, and partly on what has been cut for them in the autumn. The Huzaras, in a climate still more severe, reap great quantities of grass for their sheep, which are seldom unhoused during three months of winter, but sleep under the same roof with their master. Grass is very abundant during the summer in both countries. Bactria too, with the exception of the sandy spaces, is a verdant country and has many meadows, which are always green. In the plains the snow is seldom so deep as to prevent the cattle reaching the grass, but among the hills it is found prudent to provide in part for their provender by a stock of grass, cut in the autumn. The reaping of grass is very common in Kushmeer and in parts of Pukhlee, Bhooner, Swad, Punjkora, Cabul, and Ghuznee, but in general the sheep which have not gone to the low countries are driven out to feed on the shrubs and withered herbage of a hill exposed to the sun, which has been reserved for this purpose. Straw also composes a great part of their food.

122. With respect to Chinese Toorkistan, we have little information. Yarkund and the sandy tracts (see para. 106) have but little grass. Khootun is in this respect much superior, as in most others. As to independent Toorkistan beyond the Oxus, generally considered, it is not inferior to Bactria, but within it we are to distinguish—1st, the dry sandy plains—2nd, the moist plains and meadows—3rd the little and lower hills—4th, the high hills and elevated plains. The first has least grass; the new leaf which had been nourished by the snow is on the 20th March about three inches long; after three months it withers from the heat of the sun. The meadows have abundance of grass, which is continually renewed. Some banks of rivers have a close sweet turf, but the meadows in general afford a deep grass. The lower hills are better clothed with grass than the dry plains, but are not equal to the meadows; their grass has nearly the same periods as the former, and on a given surface perhaps supports during the year an equal number of animals. The hillocks, are, in the country beyond the Oxus, of sand, and bear a scanty grass, which soon withers. In Bactria and Muro the hillocks are of a good soil, and bear good grass. The high mountains and plains of Toorkistan have a grass which makes little progress in the spring, but grows luxuriantly in the summer, sometimes exceeding a man's stature, and it does not wither until autumn; the inhabitants

reap a portion of it for the sustenance of their stock during winter. In the west of Toorkistan this practice is but little known. In districts such as that of Samarkand, which are well cultivated, the stock, which is not very numerous, is fed on straw or hay. Where natural pasture is near and plentiful, they are driven out to it even in the depth of winter; hence an extraordinary fall of snow causes a great mortality among them. It is still more fatal to the stock of the Kirghizes and Kuzzaks, who inhabit a more rigorous climate, and having little agriculture have less resource when the surface of the ground is covered with snow. They make no provisions of dry grass, in which we are not altogether to blame them as improvident, for some have scarcely a fixed residence for winter; and the flocks are so numerous, that it would be difficult to provide sufficient provender for all. Some of the Kirghizes frequent the Pamer, which bears a most luxuriant herbage, but by reason of the cold it is not pastured more than a third part of the year. On their return, they feed their flocks in the warmer vallies below, until the heavy falls of snow and severe cold force them to retire to their *kishlaks* in the vallies, near which they have left forage remaining for the wants of winter. The sheep remove the snow with their feet, or if too deep they follow the track of the horse, where he has uncovered the herbage. All the animals drink the snow in this season. It is thus the quantity of herbage and its natural seasons, determine the mode of life of a great part of the population.

123. Pasturage may be divided into two species, the shepherd remaining in one climate, or visiting another different from his own. In warm or temperate climates far removed from any other, he feeds his flocks all the year near his own village, and according to the distance, brings them back to the village by night, or not. In very cold climates when circumstances prevent an access to more temperate ones during the winter, they subsist in that season on reserved pasture, on the grass which has been reaped, or on the straw or other products of tillage. But when in the same neighbourhood there are warm plains and cold mountains or upland plains, nature lays the foundation of a more erratic life, the flocks being driven up in the summer and down in the winter. Sometimes there are constant inhabitants in both the upper and the lower countries. It is thus the Ghiljies, who stay in the elevated country of Cabul and Ghuznee, send part of their flocks in the winter to the various warm countries, from the most southern parts of Daman to Koonur and Jellalabad. In the summer the inhabitants of these countries send a part of their sheep to the upper country, but the proportion is not considerable. Sometimes the



habitations of the people are in the vallies and plains, and they frequent the hills and upper plains in the summer—this is the practice of Kushmeer, Pukhlee, Bhooner and Punjkora. Sometimes they reside in the high country—it is thus part of the Kafirs leave their high hills in the winter to pasture their goats among the low ones, and the declivities. The Afreedies too in general stay in the upper part of their country. During the summer the shepherd shelters himself under trees or rude sheds of grass; in the winter he removes to low hills, where he finds natural or artificial caves in the rocks to receive him and his flocks by night. Some of the Dooranees near the Helbund construct habitations for themselves from the branches of trees and mud. The Dooranees, in general, Ghiljies, and Beelochees live under black tents; the Ymaks, Huzaras, and nations of Toorkistan use *khingas* made of felt and wood, or *kuppas* made of felt and reeds.

124. Some details might be given of the species of plants found in these countries, but they would be little interesting. A considerable number of spontaneous products form articles of food. The chief are the lotus, the ruwash, some of the fungins, a kind of wild vetches, a plant bearing some resemblance to the turnip, the roots of the tulip, the leaves of the plant in India called paluk,\* and the seeds of some of the gramina; other plants are used in medicine, and perhaps we have here something to learn of the natives. Perfumes are extracted from others, for instance from the grass which in India is called Gundhel or Mircheegundh,† and which according to some yielded the spikenard of the ancients. The well known dool‡ grass of India seems to extend over all these countries, some parts of which moreover have superior species. Two of these called Rishka§ and Shuftan|| are also artificially raised. The Surkunda appears to extend to the utmost verge of our inquiries to the north-west, and it is not so much from the want of proper grasses as from other circumstances, that in the countries of the west a thatched house is scarcely to be found; a flat roof with a balcony, or a vaulted one without it, are substituted. This last expedient is resorted to wherever wood is dear. Of noxious vegetables, there is none worthy of mention except it be the Bhoart. This abounds in the country of Beekaneer and the neighbouring ones, as far as our military station of Lodhiana, the sandy parts of the great Indian desert, and in some quarters of the country between the Hydaspes and Indus. Its seed which is some-

\* A species of beet. † Andropogon, nardus vahl.

‡ Panicum dactylon. Linn. § Sueerne. || A kind of trefoil.

times gathered, and even sold at a considerable price, is covered with several sharp prickles, which readily attach themselves to clothes, and are with difficulty taken out. However insignificant they may seem, they are the chief annoyance to a traveller. Beyond the Indus, and at a short distance from its banks, we do not find that grass which yields the khus\* so useful during the hot winds in India. In these countries tattees are not much used except in the hottest season, and then only by the people of condition. The plant employed is the Juwasat of India, in Peshawar called Jhoy, and by those who speak Persian Shooturkha from its being a common food of the camel; besides these uses, in some places it yields manna, for example, the neighbourhood of Candahar and Hirat, and the banks of the Chilchick (see paragraph 45). This precious substance exudes from it after the spring rains are over, and is collected by merely shaking it off. It is also produced in Toorkistan, on the dark barked or cultivated willow, and from some other plants.

#### *2nd. Of Shrubs.*

125. These countries have shrubs and low trees of several varieties and in great abundance. It may be remarked that they are most abundant in unfertile and uncultivated places; whether it be that such is their peculiar situation, or that they occupy places refused by the herbaceous and succulent plants and by the timber trees I know not. Some insinuate their roots among rocks and loose stones; some grow on the hardest clays and merest sands, and in the driest climates; and others overspread the salty deserts. Though humble, they are however useful, and demand some of our attention.

126. Some furnish food from their roots, barks, flowers, or fruits. The last only is worth mentioning, and the most remarkable species is the barberry, which abounds in the east of Toorkistan, the Ymak country, the skirts of the great northern range, and some parts of that of 34°. It is little cultivated, but that which is raised in Ghæen is much esteemed. The plant in India called Jhurbecreat extends to the foot of the hills in the northern and western directions. The Byr, which is said to be merely a cultivated species of the barberry, is raised in Peshawar but not in Khoorasan or Toorkistan, where instead of it is cultivated the Connal, a fruit which much resembles it in taste and properties, and is found wild in the hill of Bajour, in Pukhlee, some parts of Persian Khoorasan, and probably many other quarters. On the low hills in the east of Afghanistan, and those south of Kushmeer, which yield

\* *Andropogon muricatum*. Linn.

† *Hedysarum* Alhaji. Linn.

berries; such are the goorgoor, moomancee, kookee, simloo, gurinda (the Kurounda\* of Hindoostan) and some others. By the banks of streams there is found a plant which bears a fruit intermediate between the raspberry and bramble. The wild grape is found both in the warm and cool climates, but disappears in very cold ones; its fruit is sour, but is sometimes eaten either fresh or fermented. In the countries of the west, sugar being dear, various substitutes are found for it, for example, preparations of dates and other fruits, and a preparation of the sugar melon and honey; but perhaps the most common is what is called Doshab, which is sometimes made of apples or mulberries, but sterner of grapes, wild or cultivated, the juice of which is boiled to a consistence.

127. Where grasses are plentiful, as in Cabul and the cultivated parts of Khoorasan and Toorkistan, a spirit is extracted from them. In the Punjab and Sindh coarse sugar is the chief material from which spirits are extracted, but the inhabitants of the latter sometimes use the date alone, or mixed with sugar, and in the Punjab the same use is made of a fruit called Umlok, which is both wild and cultivated.

In some villages of Cabul a strong drink is extracted from mulberries, and in Kushmeer from pears. In Keerategin, and other parts of Toorkistan, there is a coarse grape called Muska, this they gather, boil, and afterwards dry in the sun. A water melon is now opened at one end, and about nine of these grapes are inserted and forced into the substance of the water melon, which being done, the orifice is shut up by re-applying the piece which had been cut out. In seven or eight days it is found that both substances have fermented, and the pulp of the water melon is converted into an intoxicating liquid fit for home use. But in Toorkistan the favorite liquors are Koomiz, made from mares' milk, and Boza, made from rice; these liquors are both wines, not spirits; they are somewhat acid, and are reckoned wholesome. Koomiz is not considered as coming under the prohibition of the law of Mahomet; but in most of the principalities, especially where the Tajiks bear sway, Boza is strictly forbidden. Although these prohibitions, whether serious or not, are quite ineffectual when they are met by a disposition to elude them, both Koomiz and Boza are less consumed in the great towns than among the pasturing tribes; yet on the whole there is less intoxication among the latter, for the people of towns indulge themselves in opium, the wine of the grape, and

\* *Carissa Carandas*. Linn.

various preparations of hemp. Not only in these countries but in most others, intoxication is commonest in cities and crowded neighbourhoods; whether it be that company invites conviviality, and conviviality leads to excess, or that the real and imaginary ills of life being more oppressive where population is accumulated, the miserable are driven to this resource to procure a temporary relief in forgetfulness. A review of these countries will furnish no arguments for the common opinion, that climate influences this part of the character. The force of example is much less doubtful, and the colonies of Persians settled in the Afghan dominions still retain the love of wine for which their ancestors were noted.

128. Very many wild shrubs and wild trees furnish materials for dyeing, but the natives seem to have no secrets in this art. The cultivated dyes are chiefly indigo, turmeric, bastard saffron,\* and madder. Indigo is unknown in the countries of the west, which are supplied from Mooltan and the neighbouring countries. Turmeric is raised in Peshawur and many other places on the east side of the hills, but Bunno and Beer, a district of Pukhlee, are the most famous for it. It is not raised in the cold countries, or in the west. Bastard saffron, a more valuable product, is not raised in very warm situations and indeed seems confined to Kushmeer and Ghaeen. The plant in India called Al† is found wild in Bajour and many other places on the east side of the hills, but is not used as a dye, though valued for its cathartic quality. The madder plant does not seem adapted for warm climates, yet some is cultivated in Gunduwah. It is raised at Kilat and Mungoochur, in Bulochistan, and some parts of Toorkistan, but its chief seats are Zumundour, and the country from Cabul to near Candahar. What comes to India chiefly passes through Candahar and Shikarpoor. Logwood, or rather sapan§ wood grows on the mountains of Kushmeer, but whatever conjectures may be formed, I have found no evidence of its existence beyond the Indus until we reach Mazunduran. Toorkistan is supplied with it and kermes from Russia.

129. For tanning and colouring leather the bark of the almond, the leaves of the Kushnar|| tree, a shrub called Barik, and many others are used. In all cases a lye of lime and alkalies is required. Leather is ill prepared in Afghanistan, and the people of the hills are fond of

\* *Carthamus tinctorius*. Linn.

‡ *Morinda cibirifolia*. Linn.

† *Curcuma longa*. Linn.

§ *Caesalpinia sappan*. Linn.

|| *Bauhinia* sp.



wearing shoes of undressed leather. Still simpler are those called chuplee, woven from the leaves of a plant which the Afghans call Muzir, and the Peshawurees, Putha ; it grows to the height of a man, but in general is under that height. It is not found in the cold countries, but extends to a certain height on the east side of the hills, beyond which is Khoorasan and Toorkistan. To the south it is found in some parts of Seeweestan, and to the east it is not known beyond the longitude of Husan Abdal. It is of the palm kind, and perhaps is yet undescribed. It bears a small fruit, which ripens in July. An Afghan will make a pair of chuplees in a single hour during a halt ; they are tied on the feet like sandals. The Kushmeerces make sandals of rice straw.

130. The Assafœtida\* plant is produced in great abundance towards the source of the Ghorbund river, and also near Isfizar (which is three days from Furah), and some other places in the west of Khoorasan. It prefers a cool climate, and the only cultivation bestowed on it is to shield it from the sun. Assafœtida is more consumed in India than in the countries of its production, where however it is used in food and also medicinally. Many other shrubs furnish articles for the native materia medica. Blisters are made with the leaves of Kureel, a plant well known in India and also in Peshawur. The plant called Akt or Uk, has a white corrosive juice, which the Rajpoots give to their infant daughters as a poison, when they do not intend to bring them up. This plant yields charcoal, and is good in tanning, dyeing, and pharmacy. The sacred Toolsee† is found in all these countries among shrubs famous for the beauty of their flowers, but the most remarkable is that called by the natives Urghuwan, or Anemone shrub. It grows in some parts of Cabul, Budukhshan, and Durwaz. In Durwaz it grows to the height of twenty feet ; spears are made of its wood, and it is a common fuel.

131. Shrubs are the chief fuel in these countries, generally considered, though there are some districts where more use is made of forest timber or the branches of large trees, and others in which the chief resource is the dung of animals. Caravans sometimes find a difficulty in procuring fuel at uninhabited stages, but few towns can be mentioned where this article is dearer than in our provinces. It is dear in Candahar and Cabul ; and in the latter a great quantity being required, it forms an important part of the expenditure of the poor.

\* *Ferula Assafœtida*. † *Asclepias gigantea*. Linn.

‡ *Ocimum sanctum*. Linn.

The rich Cabulees chiefly burn the wood of four trees—the mulberry, mastich, oak, and bulhuk, a tree so called in Cabul, and by the Persians *kurghuna*. The poor content themselves with a fuel of shrubs or dung, and the dung of horses is eagerly carried away from the streets. The pasturing tribes bring the dung of sheep for sale, which in the city is used as fuel, but in the villages as manure for grapes. The capital was a good deal distressed in the winter of 1801, when the Ghiljies of the neighbourhood interrupted the usual supplies of fuel.

132. In the Indian desert there is abundance of the plant which, after the Arabians, we call Kali, and the same is found in some other quarters. By the Persians it is called Ishkar, but I apprehend this name is given to some other alkaline plants, particularly to that known to the Hindoostanees under the name of Lance, and which is plentifully found in the Indian desert, and also in the wastes of Khoorasan, Bulochistan, and Toorkistan. In these quarters are at least two other plants of an alkaline nature; the pasturing tribes wash by means of the leaves and flowers of these plants. The Lance is thus used in Jellalabad. A common practice is to burn them and use their ashes. Near the Indian desert great use is made of the ashes of Kali, and many in Toorkistan and Khoorasan use those of the Lance. By the addition of fat a true soap is formed, and this is preferred by the more civilized part of the population. The soap of Hindoostan is superior to that of all those countries, but Toorkistan and Bokhara are noted for this manufacture. In Kushmeer and Bajour meal of the Oord is substituted for an alkali, but in all cases a proportion of lime is added.

### 3rd. Of Trees.

133. The trees best known in India, for example—bamboo, mangoe, tamarind, neem, bukaen, seesum, sal, the banyan tree, peepul, firs, peeloo, kudum, lusora, bēl, jamun, khinnee, kuchnar, umlats, tota, semur, pakur, moursuree, senjhna, jand, dhak, babool, kyr, burhur, kuthur, aonla, gondee, kumrukh, toon—are quite unknown in Cabul or the countries beyond it, and very few of them are to be seen in Kushmeer or Peshawur. The bamboo is not known beyond Khanpoor of the Gukhurs, nor is it found in any part of Sindh, or even of the Sooba of Ajmeer. The mangoe is cultivated in Sindh, but Tymoor Shah unsuccessfully attempted to introduce it at Peshawur. The mangoe is cultivated at Keech, in Bulochistan. The plantain does not bear fruit beyond the 33rd degree of latitude; it is unknown in the cold countries, and does not extend far into Bulochis-



an. The tamarind and neeni become rarer as we leave our provinces, and are unknown in Peshawur, as are the kudum, bēl, khinne, tota, moursuree, jand, kyr, burhur, kuthur, kumrukh, dhak, and some others. In Jellalabad are lost, in addition to those, the seesum, banyan tree, peepul, lusora, jamun, kuchnar, unlats, semur, senjhna, babool, peeloo, aonla, and some others. The date tree reaches Jellalabad, but extends no further in this parallel. In the south it extends through Bulochistan into Perna; and in Bulochistan it is very abundant, and a main support of the population. In Kilat however it is not found by reason of the cold, nor is it seen in Toorkistan or in any part of the north of Khoorasan.

134. In India gum is extracted chiefly from various species of the genus mimosa, which includes the kyr, babool, jand, and chhokur, of which the last only reaches Peshawur, but there is a species of mimosa, bearing a great resemblance to the first, but not found in our provinces. It is very common on all the low hills between the Hydaspes and Indus, and is called Pholoo, and yields gum, which besides being useful in medicine is sometimes eaten. It does not grow in the cold climates. It has been used with great advantage as a hedge round a fort. In Cabul and the countries of the west where none of this genus are found, gum is extracted from the cultivated trees of orchards, the jujube tree, the wild almond shrubs, and the mastich. In Toorkistan the gum mastich is used for fixing colours in the dyeing of chintz. These are not the only trees from which gum is extracted both towards India and in the west. The jujube is not seen east of the Indus, perhaps is not seen east of the valley of Cabul, but there, and in the west, it exists both wild and cultivated. The mastich is not very abundant on this side the Indus, but beyond that river it is found on most of the hills, except the warmest, and it bears the cold of the Huzara mountains. To the west it extends to Persia, and in a northern direction it crosses the Jaxartes. It is seldom found far from hills.

135. There is a certain plant in Toorkistan, and elsewhere, which is called Seehuk, and its roots yield a coarse resin. The pine species yield the best, and tar is also extracted from them. In remote situations it is more common to rive the tree with wedges than to saw it into planks. Pines are not found in all situations even of the cool countries, but prefer the steep sides of hills, never being found indigencous to plains or tame featured hills. There are some now growing at Herat planted by the late Nooa Moohummud Babunee. They are plentifully found on the sides of the great northern range, and the Bebur,

(with their various branches of a steep character and moderate height, in the middle of the range of  $34^{\circ}$ , in nearly the whole of that of  $32\frac{1}{2}^{\circ}$ , in the beginning of the salt range, on the mountain called Tuchtī-Sooli man, on the lofty mountain Bunseekurn, and the Jadran range, on the Ootman Khel hills, on the Aktan hills in Toorkistan, and some of the mountains of Chinese Toorkistan. Pines are also found in some spots of the Kokur country; Cabul is supplied from the mountain of Kulkucha about three days to the east. Bameean, Ghuznee, the Huzara and Ymak countries have no pine trees. Some are found in a few spots of Bulochistan. The natives distinguish at least seven kinds, but all are not found in the same quarters. Toorkistan and Kushmeer do not seem to possess that species which is called Julghoza, and which bears a large cone the seeds of which are idly supposed to possess many good qualities. Another species by the Afghans called Shouty, is remarkable for its being so combustible that the natives use it as a torch; this too seems unknown in Toorkistan. I have received no hint of the larch or any other deciduous species of the pine being found in any of those countries. It may be observed, that the fall of the leaf does not take place even in the same species at one time in climates so different. In Peshawur most trees retain their leaves till near spring, but in Cabul, Khoorasan, and Toorkistan the autumn frosts shed the foliage.

136. Evergreens, besides the pines, are but few. It may be conjectured holly grows on the lofty mountains, but I have never received any hint of it. The cypress is chiefly known as a cultivated tree, but is found wild in some situations. Excepting it, the natives reckon the chinār or sycamore, the most beautiful of trees. Some are found at Lahour, but are certainly not indigenous. There are two species, the Chinār or Sufeda, which has a broad shade, and the Punja-chinār or Sufedar, which grows slender and tall. The Chinār is indigenous in Kushmeer, Khost of Bunnōo, Goorzwan in the Ymak country, Durwaz, and various other situations. It prefers a moderate climate inclining to cold, deep valleys, and a moist, fat soil.

137. The same situations are most favourable to willows, but some of them are seen growing in all climates, from the plain of Peshawur to the country of the Huzaras. This is perhaps the only tree which withstands the cold of the Pamer. The willow is banished only from the hot and dry plains, and some peculiar situations. There are several species, but four are the most known, viz.—the weeping willow, which the natives call Mujnoon, and value for its beauty, the Bedi Mooskk from which is extracted a perfumed water, the green willow which is the commonest of all, and the red, which grows straight and

tall. The two last are used in building, chiefly for rafters of houses, and insects do not eat their timber. All the four species are cultivated, though some more than others. In Kushmeer and some other places the twigs of willows are given to cattle. In none of these countries are osier baskets made.

138. It is probable that the high mountains have some English trees which we cannot identify from the descriptions of the natives. The birch is plentiful in Kushmeer, and also many places of the Belur mountains, yet its bark is imported from Russia into Bokhara, where it is used to stuff saddles—an article there manufactured of good quality. The only species of oak is that known in systems by the name *Quereus Bilote*, which does not become a great tree. It is not found in Khoorasan, or Toorkistan, or in the warmer countries towards India; the Cabulees call it Buloot. I know not what are the trees called Seah, Chob, Bulhiuk, Pudda, and Gurung.

139. The mulberry grows wild over a vast expanse of country, yet is rarely seen in the plains. It grows in the vallies of all but the warmest hills. Its fruit is much improved by cultivation, and it has varied into at least twelve varieties, all of them good. There is a difference in their ripening, but the mulberry harvest generally speaking coincides with that of wheat and barley in the same climate. In various parts of Toorkistan the mulberry is very important to the natives, furnishing a fruit, a doshab, and when preserved a considerable article of food. Now here is it so important as in Punjsher, where the natives grind it into flour, and this forms the chief food of the country. The mulberry plantations are so extensive that they are not walled in, and some individuals are said to possess ten thousand trees, but this seems an exaggeration. A very good tree will bear ten maunds of mulberries, and if the average produce be one-third of this, it is calculated to support a far greater population than tillage. The produce is little affected by the seasons and is remarkably equable.

Silk is not made except in certain quarters. Kushmeer raises enough for its own scanty consumption, but Peshawur and other countries of the east are supplied from abroad, chiefly from Goojrat, and our provinces. To the west the first place which produces silk is Gundumuk, in a temperate climate between Cabul and Jellalabad, but there is none in Cabul or Ghuznee; considerable quantities are raised in the Afghan Khoorasan, but less than in the Persian part of the province and in Toorkistan. Great quantities are raised in Khootun.

140. The pistachio tree is confined to Toorkistan and that side of the Paraparnisan which lies towards it, but it is little cultivated. The wild

almond shrub (which when cultivated attains a great size) is very common in many places, but its fruit is not eatable. An oil esteemed in medicine is extracted from the stones both of this and the cultivated sort. The oil of walnuts is so cheap in Kushmeer, that it is more used in food than any other oil or fat. The tree requires a colder climate than the mastich, but like it is found in the very cold ones. Where it is naturally very abundant, it is not cultivated. A good tree in perfection will bear, it is said, forty thousand walnuts in a season, and two thousand in Cabul fetch a rupee when cheap. The wood is good for some purposes, by reason of its strength and hardness. The natives are not accustomed to use olive oil in their food, but apply it to medicinal purposes: this plant grows on most of the low hills. Though it is not found in Cabul, Toorkistan, or Khoorasan, it is plentiful in some places between the Euxine and Caspian.

141. Nearly all the species of fruits cultivated in these countries are also found natural in some parts of them, chiefly in the vallies of cool and cold mountains. These are the apple, pear, cherry, plum, apricot, peach, quince, and pomegranate. The fig, though found in most of these climates seems yet to prefer the warm. The *naring*, a species of wild orange, grow on the hills south west of Kushmeer.

142. Of these countries Kushmeer has probably the greatest variety of indigenous species, and is at the same time as well wooded as any. It may be remarked that the same situations are generally well wooded which have been already described as favourable to the pine (see paragraph 135), the steep sides of hills being favourable to its growth, whether it be that forest trees love shelter, or because they are here best secured from animals. The low hills are not so woody as the high, being more affected by shrubs and low trees of little use as timber, than by forest trees. On the whole these countries are but ill wooded, though superior to Persia. Toorkistan, excluding the deserts of the west, is on the whole superior to Afghanistan, and the northern part of that country to the southern Bulochistan has very little wood. The plains of these countries have naturally but few trees and (contrary to what takes place in most countries of Europe) they become better wooded with the progress of cultivation. Few of the natives plant for timber, but a good deal is yielded from the numerous orchards of the countries of the west, which have been planted for fruit.

(To be continued.)



ART. II.—*Journal of a trip through Kunawur, Hungrung, and Spiti, undertaken in the year 1838, under the patronage of the Asiatic Society of Bengal, for the purpose of determining the geological formation of those districts.*—By THOMAS HUTTON, Lieut., 37th Regt. N. I. Assistant Surveyor to the Agra Division.

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PART I.

Towards the close of the year 1837, a proposal was made to the Asiatic Society of Bengal, to undertake, with their patronage and assistance, an expedition into the Spiti Valley, where the late Dr. Gerard, some years since discovered the fossil exuviae of marine mollusca; but which interesting discovery was never followed up by a close examination of the geological formation in which they occurred.

The proposal meeting with the approbation of the Society, I proceeded with as little delay as possible to Simla, whence in a few days having completed my arrangements, and procured all necessaries for the journey, I started on the 14th of May, 1838.

So many travellers have at various times passed over the first four stages of my journey, and the appearance and productions of the country from Simla to Kotgurh have been so often described, that it would be tedious to repeat the information already published; and I shall therefore pass over the four first stages of my trip and commence my notes from the military post of Kotgurh, where I arrived on the 9th of May.

Here previous to starting for Kunawur, I received a visit from a Muzzeer of the Bussaher Rajah, who, at the kind suggestion of Colonel Mapp, the Political Agent, furnished me with some information regarding my route, and also sent with me one of his Churriahs or Chupprassees, to accompany me as far as Spiti, in order to procure provisions for my followers, and to give any assistance which his knowledge of the people and their different dialects would enable him to furnish.

From Kotgurh, the road winds down a steep and somewhat sudden descent of about four thousand feet to the bank of the Sutledge, along which it continues, with an occasional moderate ascent and descent, to the village of Dutnuggur, which is generally the first stage towards Rampore.

To avoid as much as possible the heat of the march, which along the bed of the river is little inferior to that of the provinces, I took the

pugdundee, or village road across the brow of the hill, by the village of Logo, where iron is procured, which is also a nearer route than by the descent to Kaypoo. A walk of about three miles and a half brought me gradually down to the Sutledge, where the thermometer which at Kotgurh at sunrise stood at 54° , now rose at ten o'clock A.M. to 98° ; this sudden change of climate from temperate to torrid was by no means an agreeable transition to a pedestrian traveller, with more than half his march still before him. Passing the village of Neert or Neertnuggur, a few miles farther on brought me to Dutnuggur, and the end of my day's journey, right glad to seek a rest and a shelter from the burning sun, beneath the grateful shade of a large burgut tree.

The presence of this beautiful tree is of itself sufficient to stamp the character of the climate of Dutnuggur, and looking around we find along with it the peepul, the bukkine, the pomegranate, and the plantain, with many shrubs abundant in the hot provinces of India. All these, with the exception of the burgut, are indigenous to the soil, but that noble tree was long since brought from the plains by some traveller now many years dead and gone, and the date even of its arrival is now alike forgotten with the name of him who brought it.

Beneath the shade of its spreading branches I pitched my tent, and amused myself until the arrival of my baggage, with watching the parrots and minas as they threw down in showers the red fruit with which the tree was loaded; even in this delightful shelter the thermometer stood at 92° , while in the sun it rose to 120° at 12 o'clock.

Those who have figured to themselves the valley of the Sutledge to consist of a large river winding beautifully through a broad and fertile vale, well cultivated and studded with habitations and villages, will feel a degree of disappointment and surprise, on finding it in reality to be no more than a steep and rugged mountain glen of unusual grandeur, with a broad and rapid torrent roaring and foaming as it rushes impetuously along the bottom over the fragments of rock, which everywhere strew its bed, causing its waters to curl and rise in waves, which hurl the white spray on high, and give to the surface of the stream the appearance of a ruffled sea.

Broad and fertile valley there is none, but in its place are frowning hills rising high on either side from the water's edge, clothed, and that scantily, with tufts of grass and shrubs, while near their ragged crests are scattered dark groves of bristling pines, giving to the scene an air of stern and bold magnificence, which cannot fail to impress the traveller with an idea that some vast and more than usual agent has been the means of stamping the landscape with unwonted grandeurs.

The banks and bed of the river are thickly strewed with rolled and water-worn fragments of every size, from the pebble to the mass of many pounds in weight, and seemingly brought down from great distances, as many of them evidently belong to formations which do not occur in these lower parts.

Boulders of quartz of gypsum, hornblende and mica slates, porphyritic gneiss, sienite and sand stones, are heaped together in confusion along the river's course, while here and there above the stream are vast beds of the same rolled stones embedded in clay and debris. These are situated solely at the lower part of the valley, commencing a little above Rampore, and increasing in magnitude from thence downwards; they are chiefly, if not altogether, situated at those places where the river takes a rapid turn, and have evidently been thrown up or deposited in the back current or still waters of the deep floods, which must have brought down the sediment and stones of which they are composed. These vast deposits of alluvial matter are horizontal, or rather preserve the line of level of the river, and upon their wide and flattened surface the traveller is pleased to see a rich and smiling cultivation. These beds are sometimes far from each other, at other places they extend along both banks of the river, by the action of whose current they have evidently been severed. Upon such are the villages of Neert, Dutnuggur, Kaypoo, and many others on both banks built, and surrounded by a beautiful and luxuriant vegetation.

Rivers of the present day are known to accumulate and deposit large beds of sand and other debris in the eddies or back waters which they make when winding through rocks or strata of unequal hardness, but these deposits of the Sutledge are not the gradual accumulations of months and years, but from their massiveness and the enormous blocks or boulders which they contain, must evidently owe their origin to a larger body of water than is now supplied even in the rainy season; they must owe their origin to some vast and perhaps oft-repeated floods from the upper parts of the district, such as the sudden outpouring or bursting of some extensive lake, which has brought down and deposited vast fragments of rocks, whose true site is situated many miles from the deposits which now contain them, and which tower up for two and even four hundred feet above the river's present level.

To state here the causes from which these beds have sprung would be to anticipate, and we shall see as we travel onwards into Spiti, that a solution is presented in the appearances which that valley exhibits.

Towards evening, the clouds began to gather thick and heavily, and

thunder growled nearer and nearer, preceded by a gale of wind that nearly tore my tent away. The rain came drifting up the valley, and curiously, but very civilly, kept the opposite bank of the river to where I was encamped, shrouding the mountains from my sight as it passed along, without even giving me a sprinkling.

The harvest had commenced at Dutnuggur as also at Kotgurh, and the sickle was in the field. In some instances the reaper and the plough were at work on the same ground, the one preparing the soil for the second crop, almost as soon as the other could gather in the first one. The first crop here consists, as in all these lower parts, of barley, wheat, poppies, and some minor grains, which are ripe in the months of May and June, when the fields are again made ready and sown with the autumn crop.

On the morning of the 21st, I resumed my pilgrimage by a good broad road along the left bank of the river, and a walk of nine miles brought me to Rampore, the capital of Bussaher.

After leaving Dutnuggur, there is scarcely any cultivation on the left bank of the Sutledge, owing to the rocks rising more abruptly from the stream, between which and their own base there is sometimes little more breadth than what is occupied by the road; at Rampore, although the town stands upon a broad flat at a turn of the river, there is no cultivation, except a few gardens in which the *burgut* again appears.

This place is therefore strictly speaking a manufacturing town, where those of its inhabitants who are not engaged in travelling with grain into Ludak and Chinese Tartary, are employed in the manufacture of *pushmeena chuddurs*, which are made from the under wool of the Tartar goats, called by the people "*pushm*" whence the word "*pushmeena*". These chudders or shawls are sold according to their quality and texture at from fourteen to twenty-five rupees each.

Rampore is also the winter residence of the Rajah, and is selected on account of the mildness of its climate at that season. To avoid the great heat which it experiences in summer, he usually repairs with his court to Sarahun, which from its greater elevation is free from such intense heat as is felt at Rampore, whose elevation is only 3,400 feet above the sea, while Sarahun is rather more than 7,000 feet, or about the height of Simla.

It is here that in the beginning of November the great fair is held, which draws together the people from the upper hills to barter the produce of those elevated tracts for that of the lower hills and plains. Here may be seen commingled in one grotesque assemblage the Tar-

tars of Hungrung, of Spiti, of Ludak and Chinese Tartary, with the inhabitants of Kunawur, of the lower hills and plains, and sometimes also with those of Europe.

Among these different tribes little or perhaps no money is exchanged, but the dealer in tobacco or grain offers to the seller of wool or woollen cloths an equivalent quantity of merchandise for that which he requires, and thus in a very short time the produce of either country or district has changed masters.

The greatest good humour and mirth prevails at this periodical "gathering of the clans," and few quarrels occur. Should two dealers however happen to fall out, or, as sometimes occurs, should the wine cup have been used too freely and broken heads ensue, the Rajah levies on the disturbers of the peace a fine according to the circumstances of the delinquents, which is paid in anything they may possess, whether money, sheep, or merchandise.

At this season the articles brought into the market from the upper hills, are blankets and sooklat from Lubrung, Khanum, Soongnum, and other places in upper Kunawur;—raisins, neozas, cummin seed, sheep, goats, and ghee from the lower parts;—chowrees, birmore, pushm wool, byangee wool, silver and gold dust in small quantities, borax and salt, numdahs, &c., from Ludak and different parts of Tartary.

These are exchanged for opium, celestial barley and wheat, tobacco, iron, butter, ghee, treacle or ghoor, linen cloths, brass pots, &c. all of which meet with a ready and profitable sale in the upper parts of the country.

Within the last three or four years, the traders from Ludak have purchased opium, which they did not take previously. Ghee is not purchased for Ludak or Tartary, but butter is taken instead, and forms a great ingredient in the mess, which they make of tea and flour, and which forms their food, as the chupattee or bannock does that of the low country people. It is purchased at Rampore at about eight seers for the rupee, and sells again in Tartary at four and five seers, so that cent per cent is no uncommon profit on this one article. Tobacco is also in great demand, and always brings a good profit to the trader.

Of the different articles manufactured in the upper parts, I shall again have occasion to revert in speaking of the several places where they are made, and I shall therefore pass on to the Rajah and his court, ere I take leave of the capital, and plunge into the woods and forests of Runawur. The Rajah is an ugly, common looking fellow, of about thirty years of age, and is of the Chuttree caste of Hindoos.

He is married, but has no legitimate offspring to succeed him, although he has a son and a daughter by some mistress or frail damsel, who doubtless, like a highland lassie of the olden time, would have thought it a crime to refuse the laird anything in her power to bestow. Should he die and leave no legitimate heir to succeed him, his territories will fall to the British Government.

He has three chief vuzeers who manage the affairs of his territories, and who in time of war would take command of his forces, as it is contrary to the custom of the country for the Rajah to do so in person. These three are equal in rank, and their office is hereditary.

Below them are several inferior officers also called vuzeers, whose office is not hereditary, but who are elected or rather nominated by the Rajah annually, and they seem to be thannadars of different pergunnahs; among this class is Puttee Kaur, Dr. Gerard's friend, who has lately been appointed vuzeer of Hungrung. The personal attendants or immediate household of the Rajah, consists of two sets of men called Churriahs, and Hazrees.

The Churriah derives his name from part of his duty being to carry the Churree, or silver stick, on occasions of ceremony before the Rajah. His duties are chiefly those of a Chupprasseer, and he is sent into different pergunnahs to collect the revenue, to report any misconduct, and to see that the people are equitably assessed, that is, to point out who may be taxed more heavily, and who should be excused,—and in fact, to ferret out and report to the Rajah the conduct and circumstances of all his subjects.

Those who are smart, and acquit themselves to the satisfaction of their chief in this system of espionage, are usually high in favour, and receive occasional substantial presents in token of his approbation, while those who are lukewarm, lazy, or who are wanting in tact, get nothing but their trouble, for the Rajah gives no pay to his servants, their services on the contrary being compulsory.

The Churriahs form a body of from sixty to eighty men, never exceeding the one or falling short of the other number; they have three officers who, in the language of the country, are called "Pulsur," "Buttoongee," and "Naigee," answering to Soobadar, Jemedar, and Burkundauze. They are exempt from military service, and remain with the Rajah. They are drawn from the district of Kunawur, and are compelled to obey summons, unless it graciously pleases his Highness to excuse them, in which case however he takes good care to exact a fine for their non-attendance.

Some wisdom is shown in the selection of this body, as none are

taken but men in easy circumstances, who possess either lands or flocks, the Rajah rightly thinking that those who are well off, will be more likely to keep a sharp eye on the discontented or troublesome characters, than those who have all to gain, and nothing to lose. He has also the satisfaction of reflecting that in case of misconduct they possess the means of paying a heavy fine.

The Hazrees are a larger body of men than the Churriahs, and they sometimes perform the same duties, but in general they act as Chowkeydars or guards to the Rajah, being distributed round his camp or his palace by night, in a chain of sentries. They consist of one hundred and forty men, and have one officer called a "Gooldar"

Of their number, however, no more than forty or fifty of the smartest are required to be in attendance; the others are suffered to remain at home. They are fighting men, and in time of war would join the forces.

There is no standing army or any regular soldiery since the British Government extended its protection to Bussaher, and even before that time it resembled an half-armed mob, rather than a military force, having no uniform, and each man being armed according to circumstances, some with matchlocks, some with swords, and others who possessed neither, arming themselves with sticks and branches of trees.

This rabble was commanded by the three vuzeers if the enemy was in force, or by two or one according to the exigency or trifling nature of the disturbance.

The Rajah pays a tribute of 15,000 rupees annually to the British Government, which is levied in coin on the inhabitants according to their circumstances, some paying two annas, others four annas, and onwards to ten rupees, which is not exceeded except by the three vuzeers who pay twelve rupees each annually.

The amount of private revenue which the Rajah himself derives from Bussaher is very uncertain, and cannot be fully ascertained as it is paid in kind, consisting of lambs and kids, blankets, and other manufactures, wool, neozas, raisins, and rice from Chooara, across the Burenda pass, which is I believe the only grain he receives. If the season be bad and the flocks are sickly, or the young ones die, that portion of the revenue is excused for that year, and so likewise if the fruits or crops fail, so that his revenue varies according to the goodness or unfavourableness of the seasons. It may perhaps be roughly computed at from fifty to fifty-five thousand rupees annually.

For crimes and misdemeanours, fines are levied according to the

nature of the offence and the circumstances of the offending parties, these fines though nominally amounting to a certain number of rupees are always levied in goods.

Thus when the village of Junggee in Kunawur neglected to furnish me with coolies to carry my baggage, the Rajah ordered a fine of one hundred rupees to be levied on the inhabitants, which was to be realised in anything they had to give. The same punishment would have been inflicted on the Churriah who accompanied me to Spiti, had he refused to go. When the Rajah ordered him to prepare for the journey, he was on his way to Simla, to be present at his master's interview with the Governor General, and having already been in Spiti he felt no desire to return to it, consequently he declined going, and offered to pay a fine of five rupees if the Rajah would excuse him and appoint somebody else; but the Rajah turning to him said,—No, no, if you disobey my orders I shall not ask for five rupees, but make you pay one hundred. This was enough, for bad as was the prospect of a journey into the dreary district of Spiti, far worse for the Churriah would have been the infliction of such a fine, and he therefore departed without another word.

From Rampore to Gowra, the next stage is a long and fatiguing ascent all the way. The road winds up the side of a very steep hill, and is strewn with blocks of stone, so thickly in some places as to resemble the bed of a torrent rather than the high road between the Rajah's summer and winter residence.

The first part of the ascent is over a nearly bare hill, but the scenery improves farther on, and the way is cheered by the occurrence of a scattered forest of oaks, mulberries, rhododendron, and the "*Pinus excelsa*" or Cheel. From the crest of the ascent, a pretty view is obtained of the surrounding country; a small amphitheatre is spread beneath, the foreground consisting of gradually sloping hills shelving away towards the river, which winds along unseen below. This slope was studded over with the bright hue of the ripening crops, while round them rose thickly wooded hills, backed in their turn by the dazzling splendour of the snowy range.

From the brow of this hill the road dips suddenly down again into a thickly wooded dell, from whence it rises on the opposite side to the village of Gowra. Thinking to avoid this second ascent, I followed a bye path through the forest, and a precious scramble I had of it. The soil was so thoroughly impregnated with decomposing chlorite, that it was with some difficulty I could manage to keep upon my feet, from the greasy saponaceous nature of the rock; and when at last I

reached the stream at the bottom of the glen, from which the road again ascended, I found that the pugdundee I had chosen to follow led along the side of a hill which was daily yielding to the weather, and falling down in masses, which left a nearly perpendicular mural cliff to scramble up. Hands and knees were in some places necessary in order to avoid slipping back again, and this by the greatest exertion. We passed over some masses which the weather had detached, and which were actually tottering to their fall, and were hanging almost by nothing over the deep glen below. On my return to this place, two months and a half afterwards, in the rains, these masses had all been hurled down, and their fragments were scattered in the bed of the stream; yet another pathway had been made by the villagers to save a mile or two, and it is doubtless doomed, like its predecessors, to fall at no distance of time into the glen. This time I preferred the steepness of the road, to the wet and slippery pugdundee. We managed however to get over safe enough, and my people gave me Job's comfort, by telling me there were far worse roads ahead! Save me, thought I from bye paths in future, and I felt by no means inclined to exclaim with the courtier in *Bombastes*, "Short cut or long, to me is all the same!"

Gowra is a small village, and contains but few houses. It is situated far above the Sutledge, which winds along unseen in the depths below, and the hoarse roar of its turbid waters is even scarcely heard. Here were apples, apricots, mulberries, and citrons bearing fruit, and the barley was nearly all carried from the fields.

In the woods around the village plenty of game is found, such as the monal, college pheasant, black partridge, and chikore. At this place I halted on the 22nd of May, and the next morning after a walk of an hour and a half arrived at a small village called Mujowlee, where I again encamped, as the rest of the way to Sarahun, which is the proper march, was all up hill, and had I attempted it, my baggage and tent would not have arrived until night, and I should have got no dinner into the bargain, which to a traveller in such a country is by no means either pleasant or comfortable. The road from Gowra to Mujowlee is very good indeed, and vies in some places with those of Simla; it lies through very pretty woods of oak, firs, mulberry, and many others common to the lower hills; the wild dog-rose with its snowy flowers, spreading over the tops of the underwood or climbing high into some tall oak, was in abundance, and almost every villager had a thick roll or necklace of the flowers hung round his neck, or stuck in a bunch on one side of his bonnet.

From Mujowlee we descended into a steep khud or glen, at the bottom of which by a frail and ricketty sangho of twigs, which is continually carried away by the rise of the waters, we crossed a stream which runs down and joins the Sutledge about a mile or two lower. From this we toiled up a long and steep ascent on the side of a hill, very prettily wooded with oaks, firs, horse chesnuts, walnuts, peaches, apricots and bukkines, intermingled with the raspberry, blackberry and white dog-rose. The number of fine mulberry trees which for the last few marches had every where occurred near villages, led me to inquire if the silk-worm was known to the people, and if so, why they did not import and cultivate it. Such an insect it seemed had been heard of, but nobody appeared to know what it was like, nor had any one ever thought of introducing it to the hills; and the reply was, "We are hill people, what do we know of silk-worms?"

Nevertheless I see no reason why the insect should not thrive well in these villages along the Sutledge, where the summer enjoys a warmth unknown to Europe, and where the winter is certainly not so severe as in our native land. Food for the insect is in abundance, and is at present useless. At Simla, in the summer of 1837, I saw many caterpillars of a species of silk-worm feeding on a mulberry tree in a garden there, which shows that very little care would cause it to become an useful article of trade in the lower hills. It is indeed very probable that the insect does already occur in the places I have alluded to, although it is at present unknown to the inhabitants, who are too busily employed in the cultivation of their fields to bestow a thought on "Entomology!"

Were the insect introduced, and the people instructed in its management, which could be easily done by sending skilful hands from the plains, I have no doubt, from conversations which I held with them on the subject, that they would gladly give their attention to its cultivation; but the introduction of it must be made by those who are in some authority, as the people themselves are far too poor to run the risk of expense which any experiment might entail upon them.

After gaining the summit of the ascent from Mujowlee we leave the pergunnah of Dussow, and drop over the frontier ridge of the district of Kunawur, arriving by a short and gradual descent at the town of Sarahun.

This is the usual summer residence of the Bussaher Rajah, who flies from the heat of his capital in the month of May, and returns again in time for the annual fair of November.

The elevation of Sarahun is about 7,300 feet above the sea, and it

is situated in a beautifully wooded recess or amphitheatre formed by the hills advancing round it in a semicircle behind ; while in front they slope down in the direction of the Sutledge, from which again on the opposite bank rise the dark and usually barren hills of Kooloo.

The heights all round were in the month of May still deeply covered with snow, which however does not remain, but melts away as the rainy season sets in.

The village of Sarahun, for it cannot be called a town, has a shabby and ruinous appearance, and except at the season when the Rajah honors it with his presence, is nearly deserted. It boasts of no manufactures. At the time of my arrival the Rajah had gone to Simla to wait upon the Governor General, and having on this occasion drawn around him his retainers, the place was left with scarcely an inhabitant, except a few old women and children.

Journeying onwards from Sarahun, the road was at first tolerably level and easy, but after a mile or two it changed to a steep ascent over stones of all sizes, and sometimes overhanging the khud at places where the weight of snows had caused the whole to slip down, and where a plank or the trunk of a tree had been thrown across the gap to supply the deficiency.

The whole way was however very pretty and well wooded, and we crossed two or three streams which came rushing down from the snows on the heights, to join the Sutledge below us. One of these streams at eleven A. M. had a temperature of 45° , while the air at the same time was at 89° . From the ridge of the hill we descended for some way through a beautiful forest, in which at last, after a walk of eight good miles, we encamped at noon, surrounded by oaks, rhododendra, walnuts, horse chesnuts, apricots and mulberries ; many of the horse chesnuts were magnificent trees, and covered with their conical bunches of flowers, which with the scarlet blossoms of the rhododendron arboreum, gave a pleasing effect to the surrounding scenery. In one part of the forest we found vast beds of a large flag iris in full bloom, and quite distinct from the small species which I saw on my way to the Burrenda pass in 1836. It is not perhaps generally known that the fruit of the horse chesnut produces a beautiful and permanent dye, and as it may be procured in some abundance in the hills, the following recipe, taken from the Saturday Magazine, may not be unacceptable to those who residing in the hills, may wish to avail themselves of the produce of the country.

“ The whole fruit of the horse chesnut cut in pieces when about the size of a small gooseberry, and steeped in cold soft water, with as much

soap as will tinge the water of a whitish colour, produces a dye like anotta; the husks only, in the same manner with cold water and soap, produce a dye more or less bright according to the age of the husk. Both are permanent and will dye silk or cotton, as much of the liquor as will run clear being poured off when sufficiently dark."

During the past night at Sarahun we experienced some heavy showers of rain, accompanied by thunder and lightning which cooled the air, and gave us a delightful day to travel in. Many of the heights which before had begun to look black from the melting of the snows, were now again completely covered with a sheet of dazzling whiteness. The day continued cloudy with some heavy showers in the afternoon, and snow appeared to be falling heavily over all the neighbouring peaks.

Several flocks of sheep and goats passed our encampment during the day, on their way from Rampore to the upper parts of Kunawur; each animal was laden with flour, which is carried in small bags thrown across their backs and confined there by a crupper and band across the chest, with another under the belly, answering the purpose of a girth. Each carries according to its strength from six to twenty seers* in weight, and they form the chief beasts of burthen throughout the country, travelling ten and twelve miles daily with ease and safety over rocky parts where mules and horses could not obtain a footing.

From this encampment we continued our march, still through the forest, to the village of Tranda; the road in many places was very precipitous and rocky, and numerous rudely constructed flights of steps occurred at those places where the ascent was too abrupt and rocky to cut a road. Before climbing the last steep hill to Tranda we came to a deep glen, with a roaring torrent hurling itself along towards the Sutledge with headlong fury; over this had once been a goodly sangho bridge, composed of three trees thrown across from rock to rock, with planks of wood nailed transversely across them, but the weight of the winter snows had thrown the bridge all on one side with an awkward slope to the gulph below, and had torn half the planks away, leaving wide intervals at which there was nothing left to walk on but the round trunk of a single tree; and the dazzling foam of the waters seen beneath as the torrent rushed along, imparted to the passenger the feeling, that the crazy bridge was gliding from beneath his feet, and made it dangerous to attempt the passage. Two only of my people crossed it, and they were laughed at for their folly.

* A seer is 2 lbs.

A flock of sheep arriving while we were deliberating on the best method of crossing the stream, decided our plans at once. It was impossible for even these sure footed animals, laden as they were, to cross in safety, at least their owners would not run the risk; and in a short time therefore young trees were felled and placed across a narrower part of the stream, and covered over with bundles of twigs laid on transversely. Over this the sheep led the way unhesitatingly, and we followed in their wake. From this we climbed the ghat to Tranda, where I encamped amidst a forest of majestic Kaloo pines. From Tranda I proceeded to Nachar, a pretty walk of about eight miles, some parts being steep and rugged. The road at first ascended for a short distance, and then turning round the hill brought us to a steep descent, down which it fell somewhat abruptly in a zigzag manner to the bottom of a wooded glen. In many parts it wound backwards and forwards so suddenly, from the steepness of the hill, that on looking upwards it was no pleasant object to behold the long train of my baggage coolies slowly winding downwards in a zigzag line above my head, and while thus standing below the crazy looking scaffolding, which in many places formed the road, I could not help thinking to myself, "If those fellows with their loads should chance to come tumbling through, how terribly they would spoil the crown of a certain gentleman's hat,"—and the feeling made me hasten on to avoid the fancied, but not improbable danger.

Nachar is a small village situated at some height above the Sutledge, on the slope of the left bank. The thick forests and rocky glens from this place downwards to Sarahun, may be deemed the head quarters of the *Gooral* and *Thar* antelopes, the latter being known here by the name of "*Eimoo*." Thèr, and black and red bears are also met with, the first and last inhabiting the higher and colder portions of the range.

Bears are not found generally throughout Kunawur until the season when the grasses are ripening, and it then becomes a matter of great difficulty to prevent the vineyards being robbed at night.

Large dogs and men at this season keep nightly watch, making a continued shouting and firing of matchlocks to keep off the invader. They also commit sad havoc in the autumn crop of phuppra. At other times they are said to retire to the higher parts of the forests, where they lie concealed among the deep caves of the rocks, feeding on various roots and acorns. The Thibet bear is abundant on the heights above Nachar, as also the red variety. Here they are both said to attack and kill sheep and goats, and they are often such a

nuisance that it is considered a feather in a man's cap to shoot one. The elder brother of the Churria who accompanied me to Spiti has killed no less than fifteen bears, and was looked upon as a Nimrod in consequence.

The red variety is said to differ in nothing from the common black or Thibet species, except that it is red while the other is black. Both are said to possess the white band across the breast, but that it is constant in neither. I strongly suspect that subsequent research will prove that there are at least *two* if not *three* distinct species in these hills, namely, the Thibet bear, the red bear, and another black species without the white crescent on the breast, of smaller size and greater ferocity.

The natives say, both black and red live together in the same haunts, and that when both come down to feed at night in the vallies, the red one does not always return to the heights, but remains in the lower haunts of the black bear. If this statement be correct it would argue a greater difference in the species than that of colour, for why should climate act on some and not on all, since all are in turn found equally near the snows. If colour were the only difference, then the red one by staying in the haunts of the black bear would resume his former colour, and the black one by going to the heights would become red; but as this is said not to be the case, and that both black and red can reside together either high or low, it goes far to prove a specific distinction; the red bear is however found chiefly near the summits of the ridges, while the black one inhabits the lower and more wooded tracts in the thick forests of oak, where they feed upon the acorns and other fruits. Both species in the autumn make nightly incursions into the fields of phuppra, which they destroy in quantities, and they also in the summer approach the villages and steal the apricots.

In the winter time when food is scarce they are said to tear down the wooden hives, which are built into the walls of the houses, and to devour the honey, nor is this the extent of their plundering, for they have been known to force open the door of the sheep house, and run away with the fattest of the flock. A lad who accompanied me, hearing the questions I asked regarding these animals, very gravely declared that when the bee-hives were too high to be reached from the ground, the bears went to the forest and brought a long pole, which they planted against the wall and used as a ladder! We all laughed at this thumping fib, which was evidently made for the occasion, but he only persisted in it the more, and at last swore that he had seen them do so!!

Some are said to store their dens with grass and herbs, in which they keep themselves warm during the prevalence of the snows; others select the hollow trunk of some large decaying tree in which they form a similar warm bed. This however I look upon as a fable. There are not many about Cheenee and Punggee, and above those places they are not founded; the greatest numbers therefore inhabit the lower parts of Kunawur.

During the winter in those parts where the Emoo, the Gooral, and the Thér are found, it is the custom when the snow has fallen somewhat deeply, so that the animals cannot avail themselves of their natural speed, for parties of eight and ten men to assemble with their matchlocks and sally forth to the chace, guarding their legs from the snow by two pairs of woollen trowsers, and a warm thick pair of woollen shoes. He who is lucky enough to get first shot at the quarry is entitled by the rules of the Kunawur sporting clubs, provided he has fired with effect, to the skin of the animal, and the rest of the party share equally of the flesh, whether they have had a shot or not. The skin is the most valuable part of the prize, and out of it many useful articles are made, such as soles for their shoes, bags to carry grain and flour, and belts, &c. so that to get the first shot at the game is not only as much a point of honour as getting the brush in a fox hunt at home, but is also a source of profit to the lucky sportsman.

The bear is not held in much dread by the people of Kunawur, for in the season when they have young ones parties go forth to the chace with a few dogs and armed only with heavy *sticks*. When a bear with cubs is unkennelled by the dogs she at first makes off in great alarm, but as the dogs soon overtake and keep the cubs at bay until the huntsmen come up, she retraces her steps and wages war in defence of her young. Some skill and agility are now required by the hunters to avoid a hug, and at the same time to administer some weighty blows over the animal's head and snout, until having received a hearty cudgelling from the party, she once more makes off after her cubs, who have profited by the delay to get well ahead. The dogs however again overtake them, and again and again the poor mother returns to defend them, and receives a thrashing, until tired and exhausted she secures her own escape and leaves her offspring in the hunter's hands. Bears and leopards are sometimes killed by constructing an immense bow, charged with one or more arrows. A bait is placed to entice the animals, and connected with the bow string in such a manner that when seized the arrows are discharged into the animal's body, and with such force as often to pierce

it through and through. The skins are cured and sold at a rupee and two rupees each to the Tartars and Lamas, who take them to the upper districts and dispose of them at a profit, or make them into shoes, &c; opposite to Nachar, on the Kooloo side, the wild dog is also said to be abundant, but so difficult is it to get a sight of the animal that the natives never go in quest of it, and indeed they have such a fear of it that even if they found one, they would not fire, as they say if only wounded the whole pack turn upon the hunter and destroy him. In this there is doubtless much exaggeration, but nevertheless the idea, however erroneous, is sufficient to deter the shikarre from the chase. These dogs are also found in the forests of Chooara, where, hunting in packs, they destroy deer and other game; even the leopard and the bear are said to fly before them, and will not remain in the same jungles. They also attack the flocks, and commit great havoc. I heard of an instance where a shepherd lay in wait for their coming, armed with a matchlock, with which, from the shelter of his hut, he intended to shoot or scare them away from his fold, which they had on a former night attacked. Alas, however, for the weakness of human resolves, no sooner did the pack arrive than the shepherd's courage vanished, and like that of Bob Acres in the Rivals, fairly oozed out at the palms of his hands, and he was afraid to fire; for said he, very prudently, "Who knows if I only wound one but that they may pull down my house and attack me; no, no, let them eat their mutton in peace;" and so in truth they did, for the next morning the coward found twenty-five sheep killed and mangled by his midnight visitors. This animal is also said to exist in Chinese Tartary, and is called "Chungkoo."

It is in the forests of these lower hills, that the various beautiful species of the pheasant tribe are found, and none but the Chikore and gigantic partridge are seen in the upper portions of Kunawur.

On the 28th of May I left Nachar and travelled for a mile or two over a capital road, descending to the Sutledge, which I crossed by the Wangtoo bridge. This although dignified with the name of a bridge, is in truth no more than a good broad sangho; it is constructed entirely of wood, and consists of three or more long trunks of trees thrown across the river, the ends resting on buttresses of stone masonry, and supported by three rows of projecting beams or slanting piles. On these buttresses stand two covered gateways through which the bridge is entered on from either side; across the trees, are nailed planks of wood, and the sides were formerly protected by a slight railing, though it has now almost entirely disappeared.

The space of the sangho is the breadth of the river, or eighty feet, and its height from the water, which I measured with a plummet, was fifty-seven feet.

In former years before the invasion of Kunawur by the Goorkhas, a good bridge existed here, but it was broken down by the inhabitants of the districts, to cut off the communication across the river and check the advance of the enemy. It was never afterwards rebuilt, until the time of Capt. Kennedy, when the present sangho was thrown across.

According to accounts received from the natives, the present bridge was built by them, and Captain Kennedy on the part of Government furnished the means, to the amount of two thousand rupees. Others say that it was built at the suggestion of Capt. P. Gerard, when stationed as commercial agent at Kotgurh, with the view of facilitating the communication with Chinese Tartary and the upper portions of Kunawur, as the fleece of the Choomoortee sheep, called byangee wool, was then in demand, and purchased for the British Government.

The glen is at this point very narrow, and confined by the dark rocks of gneiss rising up abruptly on either side, and affording merely space sufficient for the bed of the river. Beneath the bridge the river rushes like a sluice, and has such a deafening roar that the voice of a person speaking on it is scarcely heard. From this, a short quarter of a mile brought us to the Wungur river, which runs down from the Kooloo side to join the Sutledge a little above the Wangtoo bridge; we crossed its stream by another sangho, and then addressed ourselves to climb the hill, which rose above us to the height of 2000 feet.

Up this ascent we toiled in a temperature of 98° over a road strewn thickly with the sharp cutting fragments of gneiss and granite, and wearied with the heat and fatigue of climbing in a midday sun. We felt vexed and disheartened on arriving at the top, to find that our labour had been all in vain, for on the opposite side of the hill the road again dipped down to the very edge of the Sutledge, while far away in the distance we could see a second long ascent to be travelled up ere we could find shelter and refreshment at the village of Churgong. The heat and length of this day's march were very painful, as the road often lay along the very brink of the river, the glare from whose waters was almost insufferable, which added to the fatigue of walking, or rather scrambling over the rocks and stones that were strewn along the banks, and the hoarse incessant roar of the foaming stream, completely fagged us all, and it was late in the evening ere my tent and baggage made their appearance.

Scarcely had we arrived at the end of the march, when to add to our discomfort a heavy thunder storm suddenly broke over us, obliging us to seek shelter where we could, and soaking my bed and other things which were still far in the rear. In the evening I witnessed one of the most beautiful rainbows I had ever beheld ; the sun was just dipping to the ridges of the hills, and shining on the vapour clouds that were floating up the valley, caused the bright colours of the rainbow to stand forth most brilliantly, one end resting on the river's brink while the wide arch was thrown across the valley and was lost beyond the snow-clad summits of the other bank.

It was nearly opposite to this village, on the left bank of the Sutledge, that the conflict took place between the Goorkhas and Kunawurrees, in which the advanced guard of the former experienced so warm a reception as to make them glad to come to terms, and a treaty was accordingly entered into, stipulating that so long as the Goorkhas refrained from entering Kunawur, a yearly tribute should be paid to them. This treaty, I believe, was never infringed, and remained in force until the expulsion of the Goorkhas from these hills by the British forces.

My people were so tired with the long march from Nachar, that they begged hard for a halt at this place : as I was anxious to push on however, and the next stage was said to be a short one, I did not comply with the request, and accordingly proceeded on the morrow to the village of Meeroo.

Nearly the whole way was up hill, and in some places steep and rugged, but it got better by degrees, until entering a forest of prickly leaved oaks it became very good and continued so, although still up hill, to the end of the march. The heat and consequent fatigue of climbing steep hills under a burning sun were almost intolerable, and I wished many a time that we were among the snows which capped the range along whose sides we were toiling. Few things are more calculated to strike the naturalist, in wandering through the grand and beautiful scenery of these stupendous hills, than the almost total absence of living creatures ; days and days he may travel on, through woods that seem to promise shelter for every various form, so diversified are the trees and plants which they produce ; yet, save the crow, or the swallow as it skims along the open grassy tracts, scarcely a living thing is met with ; all seem to shun the intermediate heights ; and while the bear and leopard, deer, and goats, flock to the higher ridges near the snow, the various species of the feathered race cling to the lower woody tracts, where sheltered and secure they rear their

oung. At Meeroo the temple was adorned with about twenty pairs of horns of the sikeen and wild sheep; the former animal is an ibex, and is said to have been once plentiful here among the snows, but of late years it has entirely disappeared from the neighbourhood. Some of the horns on the temple are of large size and were placed here by the fathers and grandfathers of the present generation, none of whom recollect seeing the living animal near the village, although here are some old men among them too. I inquired if I might take one of the horns, to which they replied with feigned astonishment, they are presented to Devi, and who will dare to rob her temple?" I disclaimed, of course, all intention of *robbing her*, but suggested that as she had now possessed the horns for some time, she might perhaps be willing to take something else *in exchange*! To this they said, she would have no objection; and after a little bye play among themselves, a hoary headed old sinner stepped forward and informed me that "the devil was willing to sell his horns at two rupees a pair!" I agreed to give it, but on examination it was found that the whole batch of them were worth nothing, being quite rotten and decayed from age and exposure to the elements, so I declined taking them. The wild sheep is still occasionally found on the heights above the village, and sometimes also a stray *jahgee*, or horned pheasant. I had made repeated inquiries regarding the actual existence of an unicorn in any part of the hills, but although I found many who had heard of such an animal, and believed in its existence, I could meet with no one who had ever seen it.

Here however I encountered an old man who had travelled much in the interior, and various parts of the mountains, and who declared that he had once beheld the unicorn. I was of course all attention, and on the tiptoe of delight with the idea that I should now have an opportunity of describing this long considered fabulous animal, and of ending discussion past, present, and future, as to its existence. Alas, my visions were doomed to fleet away, for after a long and close examination, in which it was necessary to listen to a rigmarole history of the old man's birth, parentage, and education, and his never ending travels into Tartary to purchase wool, which he had done regularly every summer of his life for forty years, it turned out to be nothing more than an ugly clumsy rhinoceros which he had seen in the possession of the Rajah of Gurwhal, and which he described as being like an elephant without a trunk, and having a horn on its nose.

From Meeroo we had an up hill march all the way, and crossed the first snow at a stream over which it formed an arch, so hard and solid

that it did not yield to the tread, though the sun at 10 A. M. was shining on it at a temperature of 82° , while the stream beneath was as low as 38° .

From this spot commenced a long ascent over the side of a grassy hill, strewn with sweet smelling violets and the little scarlet "pheasant's eye," and near the summit of which we encamped, being about three miles from Rogee, which is the usual stage, but being situated off the road at half a mile down the Khud, I preferred staying where I was for the night. From this place we had a good view of the Burrenda Pass which was indeed apparently only separated from us by the deep glen through which the Sutledge flows; it was still thickly covered with snow, and looked like a deep notch cut in the snowy range. The hill above our encampment was also heavily covered with snow, from which throughout the day, immense beds or avalanches, loosened by the heat of the sun, were constantly precipitated into the glen below, or falling from rock to rock with a heavy and deadened roar like distant thunder, and resembling in their course some mighty cataract. Towards evening as the sun dipped behind the range and the first chills of night were coming on, these sounds gradually died away, and the snow became once more bound up by frost. The height of my camp here was 9,897 feet, and the little lagomys and the chough were now first seen among the rocks that overhung us; here too, I once more found the purple iris, discovered in my trip to the Burrenda pass, but it had not yet put forth a single bud. On the 31st of May I continued my march towards Chini, by a good road that continued to ascend for some distance, and at length brought us to an elevation where many beautiful plants of iris were in full bloom; it was the same as that found at my last encampment, and among them was a single root bearing a pure white flower, showing modestly among the deep purple of the neighbouring plants, like a fair bride surrounded by the gay and glad attire of the bridal train.

A little farther up the ascent, at about 10,500 feet, I took some splendid specimens of a new species of *peepa*, the largest of that genus I have yet seen belonging to our Presidency. They were adhering by a thin viscous plate to the stalk of a coarse grass, growing at the roots of juniper and a species of furze bush, the latter beautifully covered with yellow flowers. The species being new to science, I have given it the name of "*Peepa kunawurensis*," from the district in which I obtained it. Here too the rhubarb was growing abundantly, and as I had now tasted no vegetables for many days, I gathered some of the stalk and had an excellent stew for my dinner.

About three miles from Chini we came to a place where the whole hill-side had slipped away into the Sutledge, forming a mural precipice of several thousand feet from its base to the summit. The rock was thus a perpendicular cliff, and the road which leads along the face of it is a mere scaffolding, somewhat resembling that used by builders against the side of a house. Looking down from this exalted station the Sutledge is seen, narrowed by the distance to a stream, as it winds along below at the perpendicular depth of 4,000 feet. This though an awkward place to look at, and somewhat like walking in the gutter of a fourteen storied house in the "gude town o' auld Reekie," is nevertheless perfectly strong and safe, and almost capable of allowing two people to walk abreast, so that unless one wishes to look below into the yawning abyss, it may be passed over without having been once seen. That it is safe, may be gathered from the fact that flocks of sheep and goats laden with attah and grain, pass over it almost daily during the summer months, as also men; in fact it is the high road in every sense of the term between Rampore and Tartary.

Much has been said and written concerning the dangers of the way, but the road, taking it on an *average*, has hitherto been *excellent*, and though here and there, from stress of weather, it is at times a little broken and perilous, yet those places are so few, and continue for such short distances, that they cannot be allowed to characterise it, or to admit of its being called dangerous or even bad.

True enough it is, that one of these bad places may be the means of breaking a man's neck if he chance to slip, but the answer to that is, that he who cannot keep his feet, or who grows giddy at the sight of the depths below, has no business to travel over "bank and brae." The road is kept in repair by the zemindars of villages, by order of the Rajah, and much credit is, I think, due to them for the manner in which they perform the task; for with very little additional care to that which is now bestowed upon it, it might vie with any of those of the lower hills, and is even now superior to them in many parts.

There is no spot, in fact, even the worst, which a man ought to turn away from, and though I would not recommend a lady to try them, I can safely say, that I have crossed many a worse place in the khuds near Simla, while in search of objects of natural history. But after all, the difficulties of a road will be always estimated according to the imagination or temperament of the traveller; for he who is accustomed to mountain scenes, or to scramble over all places as they may occur, will laugh at that from which another man would turn away; habit is a great thing even here, and that which seems

dangerous at first, becomes nothing when one is accustomed to it. Thus it may happen that others shall follow in my path and laugh at that which I have called bad or dangerous.

The scenery from Meeroo to Chini is beautifully grand and imposing, the snowy range on the left bank being spread along the whole way like a fair white sheet, and raising its ragged outline far above all vegetation, till it attains, as in the bold giant peaks of the Ruldung group overhanging Chini, an elevation of twenty-two thousand feet above the sea.

The right bank of the river presents a marked contrast to this bold and awful grandeur, the hills receding more gradually and with a less shattered look, being thickly clothed to their very summits with noble forests of pines of many species, as the Kayloo, Neoza, Spun, and Cheel.

Chini, though a tolerable sized village for the hills, has a poor and ruinous appearance about it; it is situated in the midst of cultivation which is plentifully irrigated by streams from the snows above, which come dashing down in a sheet of foam as white as the snow beds from which they issue. Chini is rather the name applied to several small villages or hamlets scattered among the cultivation and resting on the slope of the right bank, than that of any one in particular. This is not uncommon in Kunawur, and occurs also at the next stage, where several are again comprehended under the one name of Punggee.

On the opposite side of the Sutledge, a few miles higher up its course than Chini, is situated the village of Pooaree, famous for producing the best kismish raisins in Kunawur. It is also the residence of one of the vuzeers, and has a *joola* of *yák's* hair ropes over the river from which a road leads up to the Burrenda pass.

On the 1st June I proceeded to Punggee, where a number of my coolies whom I had brought from Simla became alarmed at the accounts they heard people give of the scarcity and dearth of provisions in Spiti, and refused to accompany me farther. Remonstrance and advice were alike thrown away upon them, and finding that neither promises nor threats had any effect, I gave the order to the Churriah to furnish me with the necessary number. On his announcing my order to them in the Kunawur language, a most amusing scene took place; men and women, old and young, threw themselves at once with such hearty good will upon my baggage, each scrambling for a load, that I fully expected to see half the things torn to pieces in the scuffle. After much noise and laughter each succeeded in obtaining something, and off they all trudged right merrily towards

Rarung with their burdens, joking to each other as they passed the astonished mutineers, who little expected to see me thus far from home so speedily supplied with carriage. In fact they had somewhat reckoned without their host, and thought that as I was so far advanced into the hills, they might safely dictate the terms on which they wished to be retained. Five of the number afterwards repented and followed me to the next stage, begging to be reinstated, which I granted, but fourteen others went back sulkily to Simla.

In Kunawur the women often carry quite as much as the men, and several of them marched along with apparent ease under burdens which the effeminate Simla coolies pronounced to be too heavy. One fine stout Kunawuree, whipped up in the scramble four bags of shot, amounting in weight to 56 seers, or 112 lbs, and carried them on his back the whole march, which is hilly and over the worst bye paths I ever saw, even in the hills. Two men had previously brought these same bags from Simla, and grumbled at the weight which was allotted to them, namely 28 seers each. The hardy Kunawuree demanded only two annas for his work, while the Simla men had refused to carry half the weight for three annas a day. While on this subject it may not be amiss to inquire why, since throughout Kunawur and all the neighbouring districts, the coolie demands but two annas per diem for his labour, those of Simla are allowed to refuse to take less than three? For two months and a half I had occasion to hire daily a number of these men at every stage; not one ever dreamed of asking more than a paolee, or two annas, nor was there hesitation and grumbling in lifting their allotted loads; each took his burden on his back and trudged merrily along with it to his journey's end. On returning to Kotgurh not a man would move under three annas, and all objected that the loads were too heavy, although the same had often been carried for long and fatiguing stages by the women of Kunawur. The weight allotted to each coolie is, by order, not to exceed thirty seers, but when was a coolie hired within the British rule, who did not hesitate and often refuse to carry twenty seers? They will come and lift the load, pronounce it too heavy, and walk off, and as far as I know, there is no redress for it, or at least I never heard of any one getting it. It is childish to fix a load at thirty seers and yet leave the coolies at liberty to reject half the weight if it so please them. The Kunawur coolie carries more, carries quicker, and demands less for his labour, than those within our rule; with whom the fault may lay, I do not presume to say, but it seems to me that a remedy for the evil might easily be found, by an order from

those in authority regulating the fare of a coolie to be two annas a day, marching or halting, and that any man plying as a coolie and refusing to lift a load not exceeding the regulated weight, shall be subject to punishment, or be turned out of the bazar, and not allowed to ply again. For the purpose of seeing these orders carried into effect, a coolie mate or police Chupprasee could be appointed from out of the many idle hangers on, of the Political Agent, and the coolies might be ticketed or licensed to ply. From Simla to Bhar, which is in reality but three marches, a greater imposition still exists, for no coolies will go either up or down under twelve annas, which is at the rate of four annas a day, and often the demand, when Simla is filling or people are returning to the plains, is one and even two rupees. In former days things were much better managed, for there are those still living in the hills who remember a coolie's hire to have been two annas marching, and one and a half halting. Now, however, every coolie talks of non-interference, and the rights of a British subject! and threatens you with his vakeel and a lawsuit, and many other combustibles besides.

There is perhaps no bazar in India where the European is more at the mercy of the native than in that of Simla, for there exists no Nerick of any kind, and I have heard it maintained by those in authority, "that a man may demand what he pleases for his labour or his goods;" which is in other words to say, that the native may be as exorbitant as he pleases, and the European must pay the piper!

No one can more warmly advocate the strict administration of justice between man and man, than I do, whatever be his colour, whatever be his situation in life; but it appears to me by no means either just or necessary to uphold the native on all occasions, or to consider the European as always in fault. Such a system tends materially to lower the dignity of the British character without in the least increasing the popularity of him who adopts it, for the shrewd native is ever willing to join with the European in the cry, "'Tis a very bad bird that befouls its own nest!"

But to return,—“The high road across the ghats from Punggee to Leepee being impassable from the depth of snow in which it was buried, I was obliged to change my route and proceed by a lower and more circuitous road to Rarung. On leaving the main road, we followed a by-path which dipped so suddenly and abruptly down the glen that it was with the greatest difficulty we could keep from sliding down the slope, so slippery was the ground from moisture and from the pine leaves strewed around. In some places indeed a single false step, or a

fall on the back, would have sent the unfortunate flying down into the foaming torrent below, at a rate as rapid as that of a slider on a "Russian mountain." We managed however, with much care and fatigue, to get slowly and safely to the bottom, where we crossed the river (which was furnished by the snows above) on a broken sangho, formed merely of four spars laid close together, and rendered slippery by the spray which was continually dashing over it. From this we again ascended by a road not many shades better than the one by which we had just come down, and it continued thus the whole way to Rarung.

We had also to cross many smaller snow streams, which being without sangho or stepping stones, obliged us *nolens volens* to walk through them, sometimes nearly up to the knee in water, at a temperature of 38° , or only 6 degrees above the freezing point! It was indeed anything but agreeable, for we felt as if our legs were being cut off, and I vowed *coute qui coute* to cross the ghats on my return, whether they were blocked with snow or not. The forest all along this march was composed of Kayloo and Neoza pines. These names are only applied by the inhabitants of the lower hills and plains, the trees being known in Kunawur as the "Kelmung," and the "Kee," and the fruit or edible seed of the latter is alone called "Neoza."

From Rarung we had rather a better road than yesterday, but still bad, being chiefly over sharp blocks of granite and gneiss. This day we encamped at Jung-gee, and again proceeded on the morning of the 4th of June towards Leepee. The hills on the road from Punggee to Leepee have a shattered and decomposing aspect, vast masses being annually brought down by the action of the frost and snow, leaving in some parts high mural cliffs rising perpendicularly above the path to eight hundred and a thousand feet, while at their base is stretched a wide field of disjointed fragments of every size mixed up with beds of sand, decomposing mica slates, and felspar. These slope more or less gradually down to the river's edge, often at two and three thousand feet lower than the base of the cliffs. If a snow stream happens to descend near these accumulations, its waters are turned upon them by artificial drains, and in a few short months the former barren waste is seen to smile with young vineyards and rich crops of barley. But if, on the other hand, as too often happens, there is no stream near, the sands are left barren and dry along the river's course, sometimes increasing from fresh supplies from above, at others partially swept away by the force of the river when swollen by the melting snows in June and July. In the descent of these falling masses

whole acres are sometimes ploughed up, and the trees of the forest are crushed or uprooted by the rocky avalanche, more completely than if the axe had cleared the way for cultivation. This devastation is chiefly caused by the alternations of heat and frost ;—the power of the sun during the day acting on the beds of snow, causes innumerable streams to percolate through the cracks and crevices of the rocks and earth, which being frozen again during the frosts of night, cause by expansion the splitting of the granite into blocks, which being loosened by the heat of the following day from the earth which had tended to support them, come thundering down with fearful rapidity and irresistible weight through the forests which clothe the mountain's sides. After proceeding somewhat more than half way to Leepee, my guide, whose thoughts were " wool gathering," very wisely took the wrong road, and led me down a steep glen, at the bottom of which had once been a sangho across the stream, and the road from it was a somewhat nearer route to Leepee ; but alas ! when we arrived at the bottom the torrent had washed away the bridge, and although we might have forded the stream, we learned from some shepherds that it would be labour lost, as the road up the opposite side of the glen had given way and followed the bridge down the stream, so that it was impassable. In this dilemma we had nothing left for it, but to reascend on the side we were on, and the shepherds gave us some comfort, by saying we need only climb up a little way, when we should find a path. To work we went accordingly, setting our faces to the hill with a willingness that did not last very long, for we found that the short way of a Kunawurree was something like the " mile and a bittock" of bonnie old Scotland, " aye the langer, the farther we went."

This was truly the steepest hill-side I had ever encountered. Without the vestige of a path or any track, up we toiled, now grasping by the rock, and now by the roots of shrubs or tufts of grass, until at last it got so bad that we could scarcely proceed at all, partly owing to the steepness, and partly to the slippery nature of the pine leaves which thickly covered the soil. At several places the first up was obliged to let down a rope or a part of his dress to assist the others up. After a time, however, as we approached the top of the hill, and when well nigh exhausted with fatigue and heat, the ascent became more easy, and at last we debouched from the forest of pines upon a large open, swampy tract, immediately below the snows, which supplied water for a hundred rills, studded with a small yellow flowered ranunculus that I have some recollection of having seen in

similar situations in Europe. There were here many plants familiar to me, as the strawberry, the little pheasant's eye, the mare's tail, and a plant in search of which many of us in our boyish days have wandered through the fields of old England, in order to feed our rabbits, it is known, if I forget not, by the name of "queen of the meadows," or "meadow sweet," and grows abundantly, as it does here, by the side of ditches and brooks. The currant, wild rose, and dwarf willow were plentiful also, especially the latter, for which the swampy nature of the ground was particularly genial and adapted. Here we at length found the path for which we had so long toiled in vain, and now when found, as often elsewhere happens, it was not worth the trouble it had cost, being but a mere sheep track along the side of a decomposing and crumbling hill, where the footing was as insecure as well could be, and where the prospect below was inevitable death to the unfortunate who should misplace his foot or lose his balance. Time and care however took us safely to Leepee, where I was right glad to find my tent pitched; and as the Himalayan ibex or sikeen was said to be found in the neighbourhood, I determined to make it an excuse for halting a day or two. This measure had moreover become somewhat necessary, for the toil and fatigue of climbing over such broken and rugged paths as we had travelled for the last three or four days, in the heat of the noonday sun, when the thermometer generally indicated a temperature exceeding 95° , had brought on so severe a pain in my right side, that often I found it absolutely necessary to lie down for awhile on the ground, until it had somewhat abated. This, added to a severe cold, caught from the necessity we were sometimes under, of wading when profusely heated with walking, nearly knee-deep through several streams, whose waters having only recently left the beds of snow above, caused the thermometer to stand at the cooling temperature of 38° , made it necessary that I should take a rest, and while doing so, I determined to dispatch men into the upper glens in search of the long wished for ibex.

On arriving at my tent I made immediate inquiries for sportsmen, or shikarrees, and heard to my dismay that the only man in the place who knew how to handle a gun, had gone "away to the mountain's brow," to sow phuppra seed for the autumn crop. Seeing my disappointment at this unexpected piece of bad news, a little dirty, half-clad urchin offered to start off to the shikarree and tell him that a "Sahib" had arrived, which news would of itself be sufficient to bring him down. I asked how far he had to go, and when he would be back? to which he replied, "It is eight miles going and coming, but

we'll be here by sunset! At this time it was one o'clock in the day, and the first four miles were up a hill that appeared in the distance to be almost inaccessible to anything but the ibex itself, yet the hardy little mountaineer was true to his word, and returned before sunset with his friend the hunter. He was a black-faced, short, square-built fellow, with scarcely any perceptible eyes, so shaded were they by his bushy projecting eyebrows, and high cheek bones. He was well clad in woollen clothes, and round his waist was fastened a brass chain, from which was suspended a steel, a powder flask, and a long sharp knife. He was a hardy looking fellow, and from his frank and easy manner evidently one who could boldly look danger in the face, and who knew how to meet it like a man. He was as keen and anxious for a brush with the ibex, as I was to obtain one, so that powder and balls being furnished, he declared his readiness to start by break of day. As to my attempting to go with him, he laughed outright at the idea, and said at once, unless I staid where I was, he would not go, for I should infallibly break my neck, and spoil his sport into the bargain.

The chase of these animals is one often attended with great danger, from the inaccessible nature of the cliffs among which they love to roam, and there are few who are hardy enough to follow it. Often the hunter is obliged to crawl on his hands and knees along some ledge of rock projecting over a glen or chasm of several thousand feet in depth, and from such a spot laying on his belly, snake-like, he draws himself along, takes aim, and fires on the unsuspecting herd. If the shot be successful, it is still a matter of much difficulty and danger to procure the quarry, from the steepness of the rocks among which it lies, and too often the last struggle of departing life causes it, when almost within the hunter's grasp, to slip off the ledge, and fall headlong with thundering crash down into the yawning gulph, a prey to the vulture and the crow. These animals are sought for chiefly for their skins, which are either sold or made into shoes, &c. and the horns are presented as an acceptable offering to the deity, and nailed upon the walls of the temples.

Matters being soon arranged, my sturdy friend departed to the hunting ground, accompanied by a shikarree whom I had brought with me from Kotgurh, promising to do his best, but saying that most likely he would get nothing, as the summer season coming on, caused the animals to retire to the last ridges of the mountains, where no man could follow them.

About sunset on the following day, my own shikarree returned

with a long and rueful countenance, and announced the unsuccessful termination of the day's sport. They had found a small herd, chiefly of females, and had each a shot, but with no other effect than that of scaring away the game, and nearly throwing the Leepee hunter over the cliff, for the English powder I had given him caused his match-lock to recoil so violently, that both were nearly taking flight to the depths below. On inquiring for my flat-faced friend, it appeared that he was ashamed to face me again empty handed, and therefore had stopped on the hill-side for the night, at a shepherd's hut, from whence in the morning he could easily repair to his sowing in the heights. I sent him next day a large clasp knife, with a message to be ready for me on my return, when I would give him a chance of retrieving his character as a shot. His son, who undertook to deliver the knife, seemed highly delighted with the present, and declared that I should have a specimen of the sikeen on my return, but alas, as will be seen hereafter, these promises were fated to be broken.

On the 6th of June I resumed my journey, somewhat recruited by the day's rest I had enjoyed, and proceeded by a steep ghat to Labrung and Khanum. Descending to these places from the summit of the pass, the road lay through a scattered forest of Neoza and Kayloo pines, intermingled here and there with the cedar of Kunawur, the first specimen of which we saw at Leepee. It appears to be a species of juniper, and sometimes attains a goodly size, though generally it is dwarfish, and crooked in the extreme. The names by which it is known in Kunawur and Hungrung are "Lewr," and "Shoor;" its wood is esteemed as incense, and offered by the Lamas to their gods. Small quantities of it are also burned to charcoal and used in the manufacture of gunpowder. The planks obtained from it are used in the construction of temples, and they are sometimes also in demand at Simla, to make boxes with. Scattered over the more open parts, were beds of juniper and tilloo (also a species of cedar used as incense) and the yellow flowering furze already seen near Chini.

After an easy march we encamped at Labrung, a small and filthy looking place, built on the edge of a shelving hill. The town of Khanum is of goodly size, and stands opposite to Labrung, the two places being merely separated by a narrow glen. In this town many Lamas reside, but at the time of my arrival the principal of them had gone to Simla in the train of the Rajah, or in other words, "the chief had put his tail on," and their presence was required to form part of it.

The season here appeared to be far behind those of the lower parts of the district, the barley being yet green and far from ripe, while

below it had long been reaped and housed. Khanum is said to produce the best sooklat, or woollen cloth, of any town in Kunawur; it is made chiefly of the byangee wool, or fleece of the Choomontee sheep, in Chinese Tartary.

From Labrung there are two roads to Soongnum, the next stage, one lying along the base of the hills, which is very bad, and merely a bye path; the other crossing the Koonung pass, which although quite practicable, was represented as being still deeply buried in snow. My people however declined attempting the heights, and preferred taking the lower road, so I started alone with the Churriah and a guide across the mountain path.

The ascent is long and steep, as may be gathered from its crest being 5,212 feet higher than our last encampment; it is however far from difficult, and the road is excellent, but unfortunately at this season we saw nothing of it above 13,000 feet, as it lay buried in the snows, which were spread in a broad white sheet over the whole range. Following the traces of a flock of sheep which some days previously had crossed the pass, we managed to do well enough without the road.

From Labrung we first ascended through a forest of Kayloo and Neoza pines, beneath which were spread vast beds of junipers and furze, with here and there a few fine currant and gooseberry bushes loaded with small green fruit, but as yet far from ripe. Farther up, these beds of junipers increased, and were intermingled with another species growing more like a bush, and the same as is known at Leepee by the name of Tilloo.

Gradually as we mounted up the hill, the pines decreased in numbers and in size, dwindling at length to dwarfish shrubs and ceasing altogether at about 12,500 feet of elevation. Here first began the snow, lying in large fields or patches, and uniting at about 13,000 feet into one broad unbroken sheet, from whence to the summit of the pass, or 1,500 feet more, it continued so. The depth generally was not great, though in some places up to the middle or even higher; where it had drifted or had been hurled down in avalanches from above, of course the depth far exceeded the stature of a man.

The only danger in crossing these fields of snow at this season, when the thaws commence, is for loaded people, for if they fall in deep or broken snow, they run a risk of either being smothered beneath the weight of their burdens, or of losing the things they carry. The fatigue however, even to us without any loads at all, was great and distressing, owing to the steepness of the latter part of the way, for the path which winds gradually to the crest being lost to sight, we were

obliged to steer for the top of the pass by a direct line upwards, and the uncertain footing we obtained in the snow, which constantly gave way beneath our feet, caused us to slide backwards down the hill for many yards before we could stop ourselves again. The sheep track too, which had hitherto been our guide, at last failed us, and we journeyed on by guess; we had however the whole day before us, and a bright unclouded sky, so it signified little how long we took in ascending.

About 800 feet from the crest of the pass, I observed in the snow the prints of feet, which at first I thought were those of a man, but the deep holes made by long claws at last arresting my attention, I found on a closer inspection that they were the traces of a bear. Well knowing that in dangerous places the instinct of a brute will often lead him safely through difficulties where man with all his knowledge would fail, I hailed these traces as an assurance of our safety, and at once unhesitatingly committed myself to bruin's guidance; nor was I wrong, for following his footsteps, they gradually led me beyond the snow, and were lost.

The crest of the ridge was uncovered for about 50 feet on the southern slope, and here we again found the road, which was visible just long enough to assure us that we were in the right direction for Soongnum, and then again disappeared beneath the snows on the northern side. I have often been told by shikarrees that there are two species of bears in the hills, a black one which feeds on fruits and grain, and which is the common Thibet species, (*Ursus Thibetanus*) and another of a reddish sandy colour, which is only seen on the confines of the snow; this species is said to feed on flesh. It is curious that the traces of the bear on Koonung pass should have been exactly on the line of direction taken by the flock, whose dung being scattered occasionally on the snow shewed that they too had gone the way that we afterwards by bruin's direction followed. It would seem at least to give some colour to the assurance that this bear lives upon flesh, for from the foot of the pass on either side, that is, from 12,500 feet to its crest, which is 14,508 feet above the sea, there was not a blade of grass perceptible, and only here and there, where the snows melted or slipped away, were a few plants of a species of "*Potentilla*" beginning to show themselves. If then this bear lived upon vegetables, he had nothing here but the junipers and furze. It could scarcely be possible that he had scented the grain with which the sheep were laden. The Churriah who accompanied me from Rampore, and who lives near Nachar and Tranda in Kunawur, declared that the two bears were of the same species, and that both lived on flesh as well as vegetables,

often attacking the flocks and even cows during the severity of winter and that he himself possessing flocks, knew it to his cost. In this case it is most probable that the animal had left the forest below the pass and traced the sheep by the scent they had left on the snow.

On gaining the summit of the pass, the thermometer only indicated a temperature of 45° at 10 A. M., and a cold keen wind was blowing from the southward. From this elevated spot we looked back over the snow-clad mountains, beneath whose summits or along whose sides we had for several days been travelling.

Viewed from this height they appeared to be nearly on a level with ourselves, and wearing a look of cold and dreary solitude, which gave a sternness to the scene not altogether pleasing to behold, as one could not help experiencing a feeling of loneliness and melancholy at the thought of losing the way, or being benighted on their hoary summits. Rising conspicuously above the rest were seen the mighty Kuldun peaks, presenting in the glare of noon a dazzling whiteness that pained the eye to view; beneath this group we had encamped at Chini.

"Far as the eye could reach, or thought could roam," all was one broad unvarying waste of snowy peaks, unbroken by a single shrub or tree, except in the depths of the darkly wooded glen, which stretched along the bottom of the pass where we were standing. Not a sound nor a rustle even caught the ear, save the rushing of the keen wind that was drifting the snow in wreath or spray before it; not a living thing was seen to stir amidst this wild and majestic scenery. All was so calm and still that it chilled one to behold it, and but for the ragged and shattered peaks around, which told of the fearful warring of the elements upon their crests, the traveller might almost suppose that the elevation had carried him beyond the strife of storms, to which this lower world is subject. It is amidst scenes like these, where words cannot be found adequately to describe the grandeur and magnificence that every where delight the eye, that man is led involuntarily to acknowledge his own comparative weakness and insignificance, and as he views the stern cold majesty of the wintry and never fading waste of snows by which he is surrounded, spite of himself his thoughts revert to Him, the impress of whose mighty hand pervades the scene, and by whose merciful care alone, he is guided safe through countless and undreamed of dangers.

From the crest of this pass, looking north-easterly, we beheld far below us, at the depth of 5,000 feet, the town of Soongnum, to attain to which we had still before us a tolerable day's journey. On making

Some remark on the length of the route from Labrung to Soongnum, the guide now for the first time informed me that it was usually made in two marches, but fearing that I should feel it cold if I slept night on the pass, he had not told me so before, lest I should have halted there. Tired with the ascent, and the toil of climbing over the slippery snow, I did not feel the least grateful to him for his consideration, which I plainly saw was more on his own account than on mine; however, as revenge is sweet, I had some consolation in the thought that he had eaten nothing that day, while I had already breakfasted, and that he would consequently be preciously hungry before he reached Soongnum. However, there was now no help for it, for the baggage had gone by a different road, so onwards and downwards we must go.

From the spot where we stood, to fully two miles and a half below us, was spread one pure unbroken sheet of driven snow; beyond this or half a mile more it was broken and lying in detached masses. No vestige of a road was seen of course, until far below where the snow had ceased. There was however no danger, although the descent was somewhat steep; and the guide setting the example, we crept ourselves on the snow, gave a slight impetus at starting to set us in motion, and away we went on the wings of the wind, at a rate which seemed to the inexperienced to argue certain destruction. I had not gone very far, when I began to feel my seat rather *moist* and *chilly* from the melting of the snow, and by no means pleasant to the feeling, so I dug my heels well in, and brought myself to a stand still. Another of the party wishing to follow my example, and not sticking his heels firm enough into the snow, toppled over from the rapidity with which he was descending, and rolled away heels over head a considerable way down the hill, amidst the shouts of laughter, which we sent after him. He got up as white as a miller, with his eyes, mouth, and ears, crammed full of snow, and affording a capital representation of "Jack Frost."

Walking, although requiring some care to keep myself from falling, was far preferable to the chilly seat; and after sundry slips and slides, I succeeded, much to my satisfaction, in reaching a spot where the snow had melted away. But my situation after all was not much mended, for the cutting wind that was blowing from the pass, soon converted my moistened inexpressibles into a cake of ice, which was infinitely worse than the melting snow, and my legs and feet soon became so benumbed by the cold, that it was painful to move at all. Seating myself once more, by direction of the guide, I took off

my shoes and socks, and proceeded with a handful of snow to rub my feet and ankles, which although somewhat painful at first, soon restored them to a healthy glow, and then by jumping and fast walking backwards and forwards, I was enabled shortly to start again, and proceeded downwards by a path infinitely more dangerous than the snows we had just quitted.

Junipers and furze were the only signs of vegetation until we again entered a thin forest of pines lower down, through which we continued to descend until we crossed the Kushkolung river below by a capital sangho, and soon after arrived at Soongnum fairly fagged.

The fatigue of this double march may be readily conceived by those who have scaled the rugged sides of the hoary headed Ben Nevis of our fatherland; the height of that mountain above the sea does not exceed that of Subathoo in the lower hills, or about 4,200 feet, and its ascent and descent, if I recollect aright, occupies from $3\frac{1}{2}$ to 4 hours. Here we ascended from Labrung to the height of 5,212 feet, over snows which were incessantly giving way beneath the feet, and causing us to slip backward many paces, added to which was the glare from the sun, which tended not a little to increase our fatigue and discomfort. From the summit of the pass our descent was 5,168 feet in perpendicular height, but the sinuosities of the road made the actual distance travelled from Labrung to Soongnum at least 15 miles.

When we recollect also that from the snow to Soongnum we travelled in a temperature of nearly 90° , the fatigue of the whole march can scarcely be conceived by those who have not experienced it. Our ascent and descent each exceeded that of Ben Nevis by one thousand feet, and there are few who have performed that journey who were not right glad to get a rest and a bit of fresh salmon, (to say nothing of the whisky toddy) at the snug little inn at Fort William. We left Labrung at six o'clock in the morning; at 10 A. M. we reached the pass; from thence to the bottom of the snow occupied us till noon, when the thermometer indicated 89° , and from thence we arrived at Soongnum at half-past 2 P. M., making the whole time from Labrung to Soongnum, eight hours and a half; or allowing at least two hours for resting and looking at the scene, we performed the actual distance in six hours and a half.

The coolies who had gone round by a lower and somewhat longer road did not arrive until 5 P. M., when they begged for a halt the next day, which I readily granted, as much on my own account as theirs, for the nature of the road from the snow to Soongnum was as if all the sharpest stones in the country had been collected there.

by which not only were my shoes cut to pieces, but my feet blistered and swollen also.

On entering the town of Soongnum I was met by a son of the vuzer, who welcomed me with a plate of raisins, and escorted me to a small bungalow of one room, built long ago by a Dr. Wilson. Shortly afterwards the vuzer himself paid me a visit, and proved to be no less a person than the frank and honest Puttee Ram, the friend of Dr. Gerard, and the source from whence he derived much of his information regarding the higher portions of the hills towards Ladak and Chinese Tartary. He has only lately been raised to his present rank. Time has not slept with him, nor failed to produce upon his hardy and once active frame its usual effects. He is now grey and bent with age, and his sons have succeeded him in their trade with the people of Choomontee and Ladak. The old man entered at once into a history of his acquaintance with Dr. Gerard and Mr. Fraser, and talked with pride over the dangers he had encountered with the former in their rambles through Spiti and its neighbourhood. He asked me if I had ever heard his name before, and the old man's eyes actually sparkled with delight, when pointing to an account of one of Gerard's trips, I told him his name was printed there. He has not only been a great traveller through the upper hills, but has also visited Kurnal, Delhi, Hansi, and Hardwar, though like all true mountaineers he sighed for home, and saw no place in all his travels to equal his own rugged hills; and truly I commend him for his choice. He is a tall, strongly built, broad shouldered fellow, but hideously ugly, his eyelids being large and sticking out over his eyeballs like cups, beneath which his eyes are scarcely visible. He has indeed, a face as like a *mastiff's* as I ever saw one.

From him I obtained a man who understood the Tartar language, to accompany me through Spiti, and he assured me I should experience no difficulties, as there was now a road across some parts of the mountains where, as in the days when Gerard first visited those parts, there was none at all. He informed me also that the lake called Chum-mor-rareel was only four days' journey from Dunkur in Spiti, so I determined if possible to get a peep at it. On inquiring for fossils, he said that Spiti produced but few; chiefly ammonites (*Salick ram*) which were found near Dunkur, but that the best place to procure them was on the Gungtang pass, near Bekhur, but the Chinese were so jealous of strangers looking at their country, that if I went there I should not be allowed to bring any thing away. Besides this, the pass was at the present season impassable, and from the lateness and

quantity of the snow which had fallen, it could not be open before the middle of August. Hearing that the ibex was found at Koopa and at Poo,ee, in the neighbourhood of Soongnum, I again distributed powder and balls, and sent people to hunt them, telling them to have some ready by the time of my return. I made also some inquiries regarding the "excellent limestone" which Gerard says he discovered in this neighbourhood, and which the natives told him they should henceforth use in the construction of their buildings.

Puttee Ram said he recollected the circumstance I alluded to, but added that Gerard *had failed* in his attempts to convert the stone into lime. He had brought some fragments of it from the Hungrung pass behind Soongnum, and having made a small kiln, he burned the stone, but instead of producing lime it melted down into a hard slag. The experiment failed, and it has never been attempted since. At Soongnum during the winter months, the weather is sometimes very severe, the whole of the surrounding hills being enveloped in one white sheet of snow, often to the depth of several feet. The town, standing at an elevation of 9,350 feet, is completely buried during heavy falls. At such times the inhabitants assist each other in clearing their roofs from the weight of snow, which not unfrequently yield to the pressure, and are converted into a heap of ruins. To guard against the rigours of such a climate, is therefore the business of the summer months, at which season, accordingly, houses are stored with fuel and grass, and the leaves of trees are accumulated for the sheep and cattle, which are safely housed till the severity of the winter has passed away. At this season there is little, often no, communication between village and village, the inhabitants contenting themselves with clearing a track from house to house in their own villages, but not venturing beyond. This does not last, however, throughout the winter, but frequent thaws take place, succeeded by fresh falls of snow.

This description is generally applicable to all places in Kunawur and the Churriah who accompanied me said he recollected three different years in which the snow had fallen ten feet deep, even so low down as Tranda and Nachar. At Simla, in the winter of 1835-36, the snow is said to have been upwards of five feet, and I myself saw on the 10th May, 1836, some of it still lying on the northern side of Jacko, on which Simla is built.

On the 9th of June I left Soongnum, and proceeded towards the first Tartar village of Hungo, by the Hungrung pass, which rises up behind Soongnum to the height of 14,837 feet above the sea. The road

led us up a glen by the side of a stream which had its origin as usual among the snows on the pass. The ascent although greater than that from Labrung to the Koonung ghat, was more gradual, and consequently much easier; nor had we so much snow to climb over, as at the former pass. The bushes in this glen, (for trees had ceased to grow) consisted of a great number of rose, currant, and gooseberry bushes, which yielded as we ascended higher on the mountain's side to furze and junipers. Towards the summit of the pass these were so thickly spread around, and the hill had such a gradual slope, that substituting furze for heather, the scene had much of the appearance of a Highland Muir, nor was this resemblance at all lessened when with a loud whistle up sprung before us from the covert some beautiful large partridges, whose plumage is very like that of the ptarmigan in its summer dress, being a mottled mixture of white and grey minutely pencilled on the back. These birds are known in the language of Kunawur by the name of "Bhair." They are found in abundance near the snows among the covers of furze and juniper, retiring as the season advances to the extreme heights of the mountains. They delight to perch upon some high projecting crag, from whence, surveying the country below, they send forth at intervals a loud and peculiar whistle.

On the crest of the pass, which we reached at half past 10 A. M., the wind was piercingly cold, and quite benumbed our fingers, the thermometer again standing, as at Koonung, at 45°.

The view from this spot was dreary enough; the town of Soongnum was lost sight of behind an elbow of the range, and on either side therefore nothing but cold bare hills were to be seen; neither village, cultivation, nor trees appeared to break the chilling waste of snows which spread around and far below us over every mountain's side; no signs of vegetation were to be seen, save the brown and withered looking furze, which even at this advanced season of the year had scarce put forth a single leaf.

The summit of this mountain is, as Gerard has truly stated, composed of limestone; but the reason of his failing to convert it into lime for economical purposes was apparent enough. The rock is one of those secondary limestones which contain large portions of clay and sand unequally distributed through them, sometimes occurring in detached nodules, at others disseminated through the whole. These limestones therefore from containing this foreign matter, refuse to burn into lime, but usually form a hardened slag, or vitrified mass within the kiln, which exactly corresponds with

the account given me by Puttee Ram of the results of Gerard's experiments.

Our path now again lay buried deep beneath the snows which were spread on the northern face in a sheet from the crest of the hills to many hundred yards below us. Here too, although it was both deeper and extending farther down than on Koonung pass, the gradual descent of the mountain's side made it far less fatiguing to walk over. We left the pass at eleven o'clock, and though we ran at a good jog-trot sort of a pace down the hill, it took us nearly three quarters of an hour by the watch ere we had cleared the first unbroken field of snow. Beyond this it was lying in patches, and here and there quite sloppy, so that my shoes, stockings, and half way up my legs were wetted through in a few minutes; lower down still, the water was running in deep streams from the snow, and as the track which had been dignified with the name of a road, was somewhat hollowed out on the mountain's side by the action of the feet of sheep and men, it of course formed a capital aqueduct, and accordingly a pure crystal stream ran along it, in which we were obliged to walk ankle deep (for there was no other safe footing to be had) for a couple of miles nearly, the temperature of the water being 43° , while that of the sun was burning over our heads at 90° . After about three hours walking and sliding by turns, we reached Hungo, a miserable ruinous village situated in a dreary glen at the foot of the pass, on a large and nearly flat tract of well cultivated land, at an elevation of 11,413 feet, and about 3,624 feet below the crest of the Hungrung pass. The snow was lying in a solid mass from the top of one of the glens arising from near the summit of the surrounding heights, down to within 150 feet of Hungo. This is however a most unusual occurrence at this season of the year, the snows having generally all disappeared from these heights by the beginning or middle of May, excepting in some of the deep recesses and ravines at the very summit of the range. Not a tree was to be seen, even at this elevation, except a few sickly looking poplars on the banks of a stream below the village, all of which had been planted there by the hand of man. The hills rising immediately behind this village are not however bare and barren, but are well covered with the furze already mentioned, which was just beginning to put forth its beautiful yellow flowers. Along with it was another species which until to day we had not noticed; it is smaller than the other, bears the same yellow flower, and extends to a much greater elevation; both are called "*Tama*," but the last mentioned is distinguished as "*Cheenka Tama*" or Chinese furze. The other species is termed by Gerard

"Tartaric furze," but the name is scarcely appropriate, since the plant is equally abundant over the higher hills of Kunawur, as on those of Tartary; and from the extensive range it takes, the name of "Himalayan furze" would suit it better. Besides which the species most common to the heights of Tartary is that known to the natives as the "Chinese furze." Both these species are cut and dried in the summer months, and form nearly the only fuel the Tartars are possessed of.

Lower down the glen, the hills assume a more desolate appearance; the furze grows scantily and at last fails altogether, leaving a bare and crumbling soil, which is annually precipitated in quantities by the action of the weather into the stream which winds its way down to join the river Lee. Over the upper part of these hills the furze is also abundant, as well as an aromatic plant, which furnishes an excellent pasturage in most of these elevated regions, where grass is either scarce or not at all procurable, to large flocks of sheep and goats, as also to the cows and yâks, which are seen sometimes, to the traveller's danger and dismay, scrambling along the whole hill-side, and hurling down stones and fragments of rocks directly on his path. It often happens too that large masses are detached by the action of the frost, and come tumbling down with a thundering crash into the glens below, rending and tearing up the soils in their descent, and scattering the fragments in volleys into the air. One of my coolies had a narrow escape from a fragment of rock, below the Hungrung pass; a mass that had hitherto been supported by the bed of snow into which it had alighted from above, was now by the thawing of the snow again let loose, and came bounding down the hill with horrid crash, until striking on a projecting crag, it was shivered into fifty fragments, one of which fell in a direct line for the coolie, who frightened at the sight, and hampered by his load, fairly stuck fast to await the coming blow. By the greatest good luck he escaped unhurt, though the stone alighting full in the kiltah on his back rolled him head over heels down the side of the hill. He soon recovered himself, however, when it was found that the only damage done was a crushed leg, not of the coolie, but of *mutton*; my provisions being in the unfortunate kiltah.

On crossing the Hungrung pass a most remarkable alteration is observable in the aspect of the country. The range on which the pass is situated forms part of the northern boundary of Kunawur, separating it from the Tartar district of Hungrung, now forming a portion of Bussaher, although evidently at some former period it has been sub-

ject to, and constituted with the Spiti district an integral part of Chinese Tartary.

The change in the nature of the country is most sudden; looking from the summit of the range in a northerly direction over Hungrung, the country is seen to wear a sad and sombre air of cheerless desolation; not a tree is to be seen, and the black and crumbling hills are either wholly barren, or clothed with nothing of larger growth than the dwarf willow and the dog-rose. The hills are chiefly of the secondary class, and being more rounded in their outline, want the grand and almost terrific beauty of the towering granitic peaks which so strongly characterises the scenery of Kunawur. Villages are situated at wide intervals from each other, and cultivation is wholly confined to the immediate vicinity of them, and usually upon a confined patch of alluvial soils, evidently the deposits of some former lakes. The practice of cultivating in steps upon the mountain's sides, appears indeed to be almost universally neglected, which however is most probably owing to the nature of the hills themselves.

On the southern side of this range lies the thickly wooded district of Kunawur, where cultivation is often carried in steps nearly to the summit of the mountains, and presenting a rich and cheerful picture which delights the eye, and imparts a feeling of joyousness and security to the traveller, as he wanders on through forests of majestic pines.

From this difference in the appearance of the two districts and their inhabitants, it would seem as if nature had elevated or interposed the Hungrung range as a barrier between two countries, destined, for some purpose, to remain distinct; and furnishes to the inquisitive a source of speculative thoughts, from which it is difficult to draw any satisfactory conclusions, for the mind is almost involuntarily lead to ask while contemplating this marked contrast, *why*, on the one side the forests should be allowed to advance actually to the mountain's base, while on the other not a single tree should be allowed to grow.

From Hungo, on the morning of the 9th of June, I proceeded to Leeo, which is a small village situated on the right bank of the Sing Pho or Lee river, in a basin or valley entirely surrounded by high granitic rocks. The spot has evidently formed part of the bed of a deep lake, the different elevations of the water being still apparent in the lines of rolled stones, which are seen on the hill-side, far above the level of the river.

The bottom of the lake, now furnishes a broad and level tract of land which is well cultivated, and from its warm and sheltered situa-

ion in the bosom of the hills, is highly fertile, producing in favorable seasons two crops, consisting of wheat, celestial, beardless, and common barley, with beans and peas. Apricots too are abundant, but this is the last village towards Spiti where they occur. The elevation is however only 9,362 feet, or about that of Soongnum in Kunawur.

From Leeo, I proceeded towards Chung or Chungo, leaving the village of Nako on the heights to the right. At Leeo we crossed the Lee by a crazy and not very agreeable sangho, the planks being so far apart that the water was seen rushing along at a fearful rate beneath, dazzling the eyes with the glare of the foam, as one looked down to secure the footing; a very necessary precaution, as the bridge from the bank slopes with a disagreeable curve towards the centre. From this we ascended to about 2,000 feet above the stream, which was a steep pull up, though luckily we had a cool and cloudy day. The road, which is very rocky and leads along the left bank of the Lee, lies generally over immense beds of fragments brought down by the elements from the heights above, and after one or two moderate ascents and descents, dips suddenly down, at the distance of nine miles from Leeo to the village of Chungo.

On the 12th of June I halted at this place for the purpose of laying in several days supply of grain for my people, in case we might not be able to procure any in Spiti, which, according to accounts we had received at Soongnum and other places in Kunawur, had been plundered of every thing by Runjeet's troops, after they had expelled the Rajah of Ladak. The Tartar guide, however, who accompanied me, declared the rumour to be false, as he had lately been in Spiti and found no lack of grain, and he therefore advised me not to burden myself with more coolies, which would be necessary if I carried supplies. In order to be safe I thought it advisable to carry a few days provisions in case of emergency, and lucky it was that I did so, for without them my people would on more than one occasion have had no food at all.

Chungo is situated in a basin somewhat similar to that of Leeo, but much more extensive; it is walled in as it were on every side by lofty hills, whose sides in many places bear witness to the former presence of a lake. Large beds of clay and sand enclosing rolled and water-worn pebbles of every size occur on all sides, while the flat and level bottom of the vale again furnishes a broad tract for cultivation. The elevation of Chungo is about 9,897 feet. It was once a populous and thriving place, containing nearly one hundred people, but for some

years past it has been on the decline, and is now half in ruins and deserted by most of its former inhabitants. The reasons for this falling off are entirely attributable to local circumstances.

The soil is a mixture of clay and sand, the latter predominating, and is a deposit from the waters of the lake which once filled the valley. The whole area formerly under cultivation might probably have exceeded one and a half mile square, although at present it scarcely equals one. Celestial, beardless, and common barley, wheat phuppra, beans, and peas, constitute the crops, and one harvest is all that is obtained; which is not to be wondered at, when we consider that on the morning of the 12th of June, at sunrise, the thermometer indicated a temperature of 35°. Snow was still lying on all the surrounding heights, and fell throughout the day on the 10th and 11th of June. In former days ere the cold soil was exhausted by the constant growth of the same crops, Chungo was at the height of its prosperity, and could even export grain to other parts, so abundant were its harvests. But alas! too soon "a change came o'er the vision of its dream," and those days are gone, now never to return.

The constant drain upon a soil naturally poor and cold, soon changes its hitherto smiling and prosperous state to one of want and poverty. The barrenness of the surrounding hills, yielding not even a scanty pasturage to sheep and cattle, at once destroyed the chance of recruiting the soil, by depriving the cultivator of the only source from whence manure might have been procured; and thus, from gathering an abundant crop, the villager was first reduced to a bare sufficiency for the wants of himself and family, and finally obliged to leave his fields untilled, and to seek employment and subsistence in a happier clime. Many have thus emigrated into Spiti, Chinese Tartary, and other places, and their once well cultivated fields now exhibit a bare and hardened sand without one blade of grass, and strewn with the fragments of rock which the weather has hurled upon them from above. Could these people command annual supplies of manure, as is the case in many parts of these hills, Chungo would possess perhaps a finer cultivation than any village in Hungrung. In Kunawur it is a common practice to mix up leaves and the young shoots of the pine trees with the dung of cattle, and this forms a capital manure for their fields, which would otherwise, in many parts, soon become nearly as impoverished as the soil of Chungo. They have moreover in most parts of Kunawur a rotation of crops, by which the soil is recruited, whereas at Chungo, one crop, and that the same for years, is all that can be produced. This village has not a tree near

for two or three days' journey, save the usual sickly looking poplars, which are planted on the banks of rivulets and streams ; thus they are deprived of all manure both animal and vegetable, and their lands will in consequence go on dwindling from bad to worse until the place shall become barren and deserted.

The lands which are now under cultivation are coaxed to yield a scanty crop, by the annual small quantity of wheat and barley straws which are ploughed in, and by the addition of the small portion of dung which is obtained from a few goats and cows which graze on the edges of the fields, where grass and a yellow flowering lucerne spring up abundantly along the banks of the little rills, with which the fields are irrigated.

On the 13th of June, I again proceeded towards Spiti by a road which led us up the heights above Chungo. Many places on this day's march indicated the former existence of a deep water over the hills, at a height of 2,500 and 3,000 feet above the present channel of the river, which winds along beneath. Here the road stretches along the sides of hills shelving gradually towards the stream, along whose banks are wide and extensive level plains of several miles in area, and the hills receding on either side form a wide valley, bare of every sign of vegetation save the furze, the dog-rose, and the willow, with here and there a few dwarf bushes of the cedar. Trees there are none, and villages are now not seen for many days. All around seems cold and cheerless ; not a living thing to break the deep silent melancholy which pervades the scene, and the traveller feels chilled, and his spirits flag, he knows not why, as he wanders on through the dreary and barren waste.

How marked a contrast does the scene present to the rich and wooded regions of Kunawur ; here all is black and charred, and a mournful silence reigns around, unbroken save by the hoarse roar of the mountain stream, or the shrill whistle of the Bhair among the snows.

Journeying onwards from our last encampment, we came suddenly upon a deep rent or chasm in the rocks, through which at some depth below ran a rapid stream. Over this, from rock to rock a few loosely twisted ropes or withes of willow twigs were stretched to answer for the purpose of a bridge, and on these were placed large flat slabs of mica slate, apparently sufficient by their own weight alone to break through their frail support. Over this we walked, and though somewhat springy and unsteady to the tread, it was nevertheless perfectly strong, and is the only bridge for passengers and cattle. At a little distance from where we crossed, alarmed by the noise we made, up

started from among the rocks a small flock of *Burrul*, or wild sheep which began leisurely to scale the steep sides of the glen, springing from ledge to ledge till they attained to a place of easy ascent, when, as if satisfied that they could bid defiance to pursuit, they stopped to survey our party. A shout from some one in the rear, again set them in motion towards the summit of the mountain from which we had just descended; the direction they took, lay right across the path, and just at the moment when they gained it, my shikarree came in sight, on a part of the hill above them, a shrill whistle from one of the Tartars caught the ear of the hunter, who was soon instructed by signs to blow his match and give chase.

From his greater elevation he was able to bring himself near the line the animals were taking, and at the same time to screen himself from their view until just within gun-shot, when they perceived him. In an instant a flash was seen, and the sharp crack of the matchlock, ringing in echoes among the rocks, told that the quarry had come within reach, and at the same moment off bounded the flock towards the most inaccessible part of the mountain. The shot however had not been fired in vain, for suddenly the leading sheep was seen to turn downwards and avoid the rocks, as if conscious that he had not power to scale them, and taking an easier and more slanting direction along the side of the cliff, he soon slackened his pace and laid down. The rest of the flock losing their leader turned downwards also and rejoined him. The shikarree in the meantime had reloaded, and was again warily stealing on from rock to rock upon his game, but they were now fully on the alert, and once more leaving their wounded companion, bounded up the rocks at a rapid pace. Again the bright flash of the matchlock was seen, but alas, this time there followed no report, and ere the hunter could reprime, the sheep had won the mountain's brow and disappeared. Nor had the wounded animal failed to avail himself of the chance afforded for escape, but scrambling along the side of the rocky glen, he was fast gaining on a place where a turn of the mountain would have screened him from our sight, when scrambling up a rugged and projecting ledge his strength failed him, and falling backwards with a cry of terror, we saw him, for a while quivering as he fell headlong from rock to rock, and was lost in the rush of waters at the bottom of the chasm.

No village occurring this day to bless our lounging sight, we at length encamped, after a long march, on the side of the hill, at a spot where sheep are usually penned for the night when travelling with

grain. This spot was called by the Tartars Chungreezing, and here I pitched my blanket-tent at the height of 12,040 feet above the sea. We passed a cold and comfortless night owing to the high keen wind which came whistling down from the snowy peaks above us. At sunset the thermometer stood at 48°, and at sunrise on the morning of the 14th of June, again at 35°! A nice midsummer temperature! what must the winter be? On the 14th we descended by a very rugged and precipitous pathway to the bed of the Paratee river, a branch of the Lee, which comes down from lake Chummor-rareel, through Chinese Tartary, and joins the latter river above Skialkur. This we crossed by the "stone sangho," as it is called, which is formed by several enormous masses of granite which have fallen from above, and become so firmly wedge into the bed of the river, as to form a safer and more durable bridge than any that could be constructed by the natives, and which from its great weight the waters are unable to remove. A small stream which runs down into the Paratee, a little distance below this bridge, is said to be the boundary line of Bussaher and Chinese Tartary.

Here then we were in the dominions of the celestial emperor, and as we crossed the sangho we were met by a deputation from the Chinese authorities, who demanded to know what were our intentions in entering their country, and how far we had determined to travel through it, intimating at the same time very politely, that they would "prefer our room, to our company," by telling us that we need expect no assistance or supplies of any kind. I had no intention of penetrating farther than was requisite into their country, but this being the only road yet open into Spiti, I had been necessarily compelled to follow it, as after all it merely ran across a corner of their territory for about a mile or so. Wishing however to ascertain whether, after having gone through the ceremony of prohibiting our advance to satisfy their rulers, they could not be prevailed upon to wink at our proceedings, I told this rough ambassador that I would require no supplies, nor take anything from the country, if he would allow me to proceed as far as Choomontee. His reply was evidently borrowed from the Chinese officers, and was worthy of the great Bombastes himself;—"When horns grow from the heads of men, and wool is gathered from the rocks; then may the Ferree advance,—but not till then!" This was too ridiculous to be withstood, and we enjoyed a hearty laugh, while the dignified officer strutted away, pleased with the assurance that I was only crossing into Spiti.

His words brought to mind the old Scotch ballad,

“ The swan, she said, the lake’s clear breast,
 May barter for the eagle’s nest ;
 The Awe’s fierce stream may backward turn,
 Ben Cruachan fall and crush Kilchurn,
 Our kilted clans when blood runs high,
 Before the foe may turn and fly ;
 But, I, were all these marvels done,
 “ Would never wed the Earlie’s son.” —

And I thought it by no means improbable that the sequel might turn out after the same fashion ;—

“ Still, in the water lily’s shade,
 Her wonted nest the wild swan made ;
 Ben Cruachan stands as fast as ever,
 Still onward foams the Awe’s fierce river ;
 Before the foe when blood ran high,
 No Highland brogue has turned to fly ;
 Yet Nora’s vow is lost and won,
 She’s married to the Earlie’s son.

and so it may be hereafter that the “ Feringee” shall tread those now forbidden scenes, though his head be unadorned with horns, and wool be not gathered from the rocks.

It appears however from the accounts of the people, that so many travellers have at different times wandered through the upper hills, without any apparent object, save that of looking at the country, that the suspicions of the Chinese have been kept on the alert, and they are more particular than ever in enforcing their orders, especially since Runjeet’s troops in Ladak have thrown out some hints of paying them a visit, when they have settled the affairs of their late conquest. There is however little chance of their carrying the threat into execution, as Chinese Tartary holds out to them no chance of plunder save its splendid flocks of sheep, which would easily be driven far beyond their reach, and leave them a barren waste for their portion.

Having crossed the stone sangho, we proceeded up the side of a hill by what the guide termed a road, though I could not distinguish it from the surrounding mass of crumbling soils. It got better, however, as we gained the top, and a short distance brought us to a small stream, across which we stepped out of Chinese Tartary into Spiti, dependent on Ladak. From this we travelled for some miles along the side of a bare black hill of decomposing shale, and then descending to a level plain of clay and rolled stone, we crossed a river which the Tartars called “ Gew,” from its passing a village of that name in Chinese Tartary. Above this river on the opposite bank, the beds of

alluvial clays towered up to some height, and the surface being flat and studded with a few bushes was pointed out as the usual halting place. As by halting here however we should have had a long and fatiguing march on the morrow to Larree, I thought it advisable to push on for another level spot, a couple of miles farther, where the Tartars said there was a stream of good water, and shelter beneath the rocks for all my people. The road now ran along the left bank of the Spiti river, at about 300 feet above its level.

The Spiti is a larger and finer looking river than the Sutledge, and the people of the country, as well as the Kunawurees who have seen the two, say that it is never equalled by the latter, except during the winter months, when the severity of the frosts in the districts through which the Spiti flows, causes a less plentiful supply of water to fall into it.

Its waters though rapid and muddy, have in general far less of that dashing violence which the Sutledge exhibits. This is most probably to be attributed to the nature of the country through which it flows. The Sutledge winding its rapid course among hard rocks of the primary formation, must often meet with obstacles, which cause it to break in impotent fury on its banks, in waves which hurl the spray far on high, curling and bubbling as it flows along over stones and boulders of various sizes.

The Spiti, on the other hand, though sometimes violent and rough, more generally glides along in a broad and rapid sheet through rocks belonging to the secondary class, and whose less firm and solid texture yields to the action of the current, which sweeps their crumbling fragments irresistibly before it.

The observations of Dr. Gerard also serve to corroborate the information furnished by the natives relatively to the two rivers. According to that traveller, the greatest breadth of the Sutledge at its narrowest parts where bridges occur is 211 feet, while at other places he measured it 450 feet across. This however is low down, and after the river has received the additional waters of the Spiti and Para, united in the Lee; the true comparison therefore cannot be formed, after the junction of the two rivers, but before.

At Skialkur, according to Gerard, the Lee in breadth was ninety-two feet, and in August he thought it contained fully as much water as the Sutledge, than which it was broadest, the latter river being at their confluence but seventy-four feet. The true comparison of the Spiti and the Sutledge, must be instituted however, before the junction of the Paratee with the former, and of the Lee with the latter,

and we consequently find from the measurements of the enterprising traveller already mentioned, that the general breadth of the Spiti was from 258 to 274 feet across.

In October, he states the quantity of water to be less than that of the Sutledge, which being the season when the rigors of winter have begun in Spiti, is exactly a result corresponding to the information derived from the inhabitants of the district.

After the waters of the Spiti and Paratee rivers have united to form the Lec, the Tartars usually apply to it the name of "Singpho," which in their language appears to signify "a river"; while smaller streams and muddees, are called "Rokpho," or nullahs. Each river is therefore distinguished by the name of the country through which it flows, or sometimes even by that of a village on its banks. Thus the Lee evidently derives its name from the village of Leeo, and is the "Lee-ka-Singpho"; the Paratee, rising from lake Chummor-rareel, and flowing through Chinese Tartary, is called the "Cheen-ka-Singpho," or "Para-ka-Singpho," derived from the Para or Paralassa mountains; and the Spiti is the "Spiti-ka-Singpho." The word Para signifies lofty, and thus Paratee is literally, "Lofty-water," or a "river of high source," "tee" signifying water in Kunawur. Paralassa would therefore appear to signify a lofty mountain range, as "Kylas" is known to signify lofty peaks in Kunawur. The Lingtee, a minor stream which joins the Spiti above Dunkur, but of which Gerard makes no mention; and the "Gew" flowing down from Chinese Tartary into the Spiti below Larree, receive the names of "Lingtee-ka-Rokpho" and "Gew-ka-Rokpho" both derived from villages on their banks. After resting awhile beneath the shade of an overhanging rock and refreshing myself with a few hard biscuits, and a draught from the turbid stream, we again set ourselves in motion, and a walk of two or three miles brought us to an extensive piece of level ground, where the guide said we were to encamp, and accordingly we halted, right glad to get a rest and shelter from the sun, in the shade of the rocks around us.

Creeping into the caves which are scooped out by the wandering shepherds as a place of shelter for the night, most of the party soon fell fast asleep, for we had travelled several miles in a temperature of 120°, and the glare from the rapid waters below our path, in conjunction with the heat from the rocks, tended to induce a feeling of langor and fatigue, which from the proximity of the snow on the heights above us, we had little expected to feel. We had thus wiled away about two hours in the arms of Morpheus, when we were aroused

by the noisy arrival of some of the people with my tent and baggage, and proceeding in search of water, we now first ascertained to our dismay that the stream was dry; fuel, too, another most essential necessary, was likewise wanting; so bestowing a few hearty growls on the Tartar for his stupidity, we once more proceeded in search of a snow stream and some bushes.

Luckily we soon came to a spot which furnished the latter, but as there was no stream near we were obliged to content ourselves with the water of the muddy river.

Here then we encamped once more on the hill side, without having seen the vestige of a habitation throughout this second day of our wanderings in Spiti. Around us, however, were plenty of rocks to afford shelter to my people in case of a storm or bad weather, and as the day was fine and warm, we managed to make ourselves tolerably comfortable in spite of muddy water, and a scarcity of fuel, which latter consisted solely of the dried stalks and roots of a small shrub growing among the rocks near us.

During the day's march we had passed over many level tracts of alluvial soils which seemed so well adapted for cultivation and villages, that I remarked to the guide my surprise that so much level land should remain neglected, while so much trouble was expended in Kunawur on strips on the hill side. He replied that many a longing eye had often been directed to these plains, but the difficulty or rather impossibility of conveying water to them, had deterred all from settling there.

These broad alluvial deposits are now all high above the river's course, and from the precipitous nature of the rocky banks within which it is confined, no aid could be derived from it.

Rain is here almost unknown, falling only like angel's visits, and even then so sparingly as to be of no use except to allay the clouds of dust for a few hours.

The only season, then, in which much moisture is obtained, is precisely that in which no vegetation can be produced, namely in the winter months, when falls of snow are both heavy and frequent, and continue often, more or less, from August till the end of April.

Of these broad flats the people would gladly avail themselves could water be procured to irrigate them, and smiling fields and prosperous villages would soon appear where all is now barren and desolate. On similar deposits are the villages of Leeo, Chango, Soomra, and Larree, built where streams flow down from the surrounding heights to fertilize the soil. They are, however, almost all subject to a great

want of manure, and their fields in consequence soon become impoverished, and do not yield a suitable return for the care and labour which are bestowed upon them.

Thus at each of these places, with the exception of Leeo, many fields once under cultivation are now left barren, and their owners have been compelled to seek that subsistence for their families in some more favoured spot, which their native soil denied them.

THOMAS HUTTON, *Capt.*

CANDAHAR,
8th December, 1839.

Assistant Paymaster and Commissariat
Offit. S.S.F.

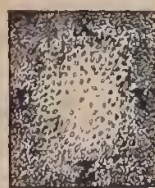
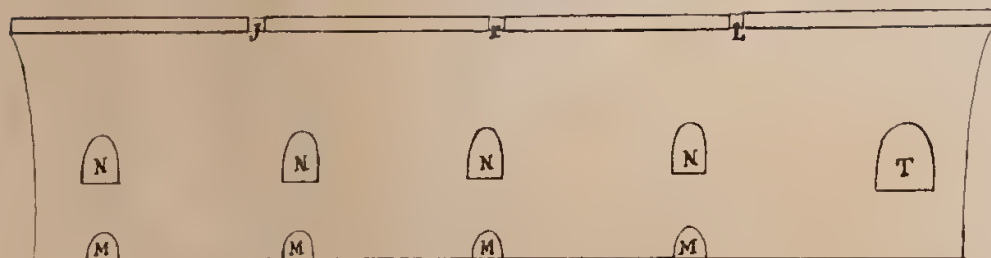
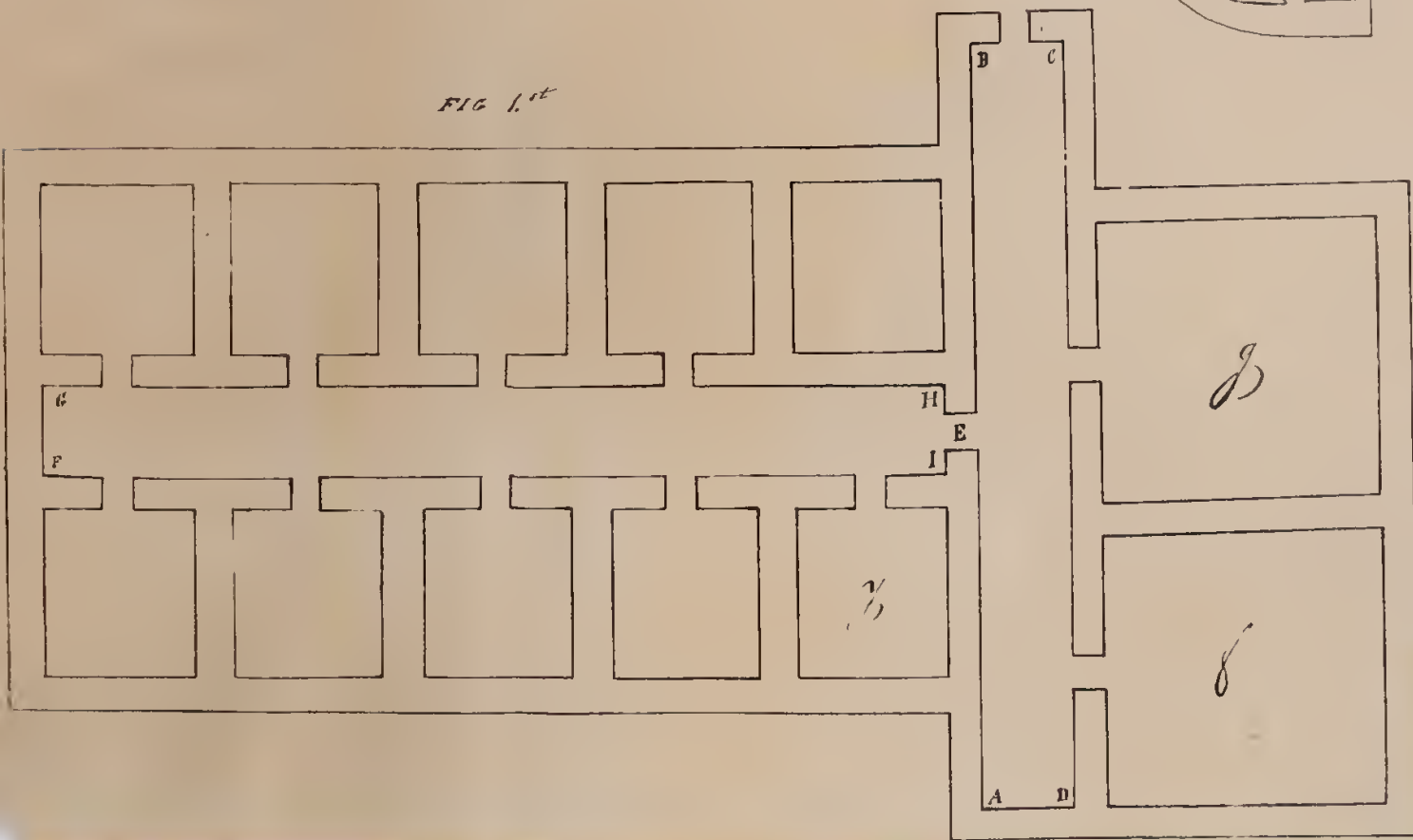
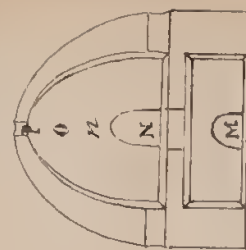
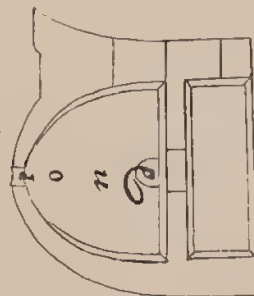
ART. III.—*Notes on various Fossil Sites on the Nerbudda ; illustrated by specimens and drawings.*

In the following paper I propose to place on record the progress made in fossil discoveries from Hoshungabad up the Nerbudda river, to Jubulpoor, a distance of some 200 miles.

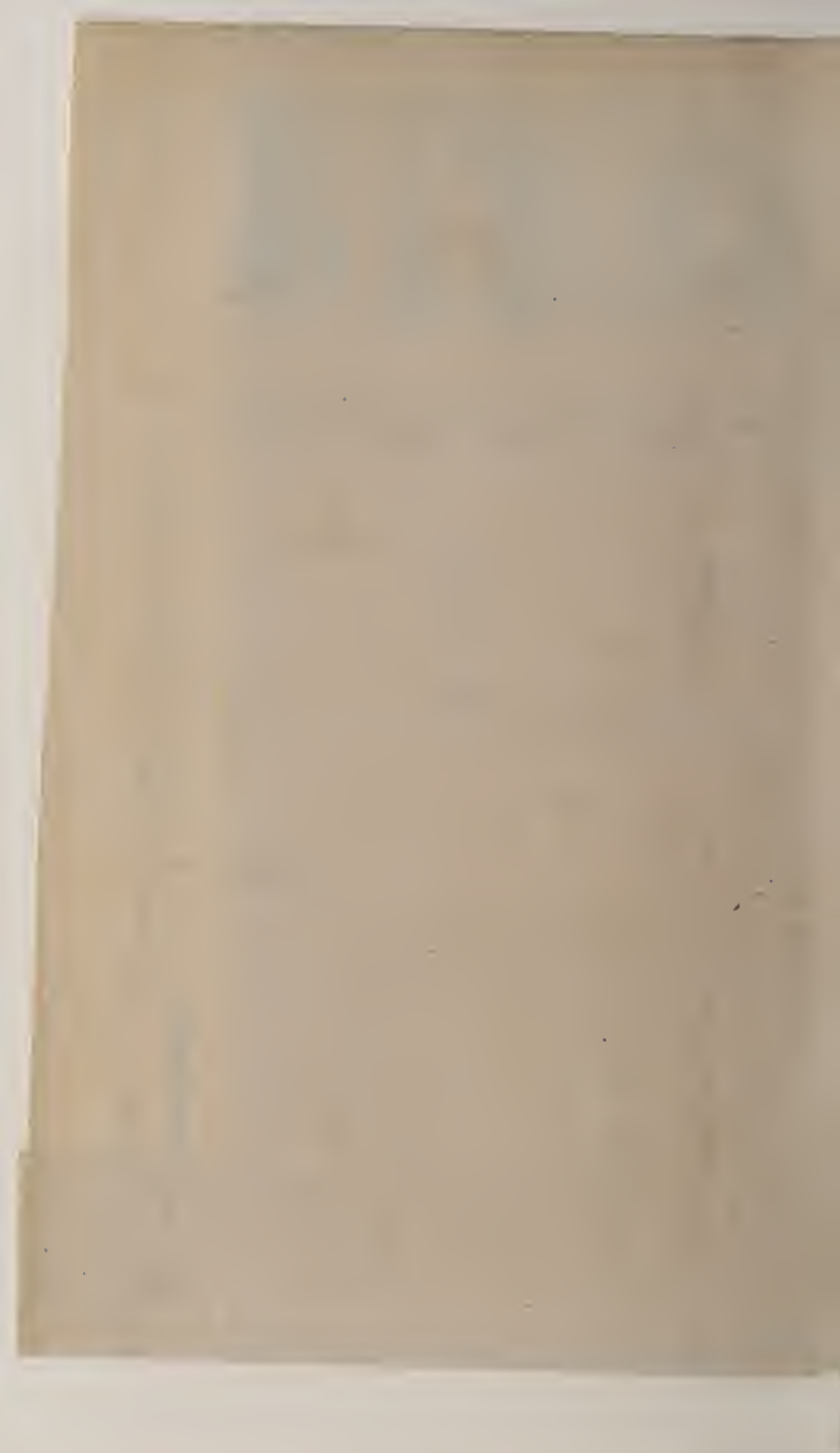
Hoshungabad has already been brought to the notice of the Society as a large deposit, a field zealously followed up by Major Ouseley, then in charge of that district, by whose exertions the upper jaw now laid before the Society has been brought to light, having served for years, unknown, as a Dhobee's board for washing clothes on, ere a cognoscent eye lit upon it; for at first, it had the appearance only of an oblong square mass of the conglomerate of the river, excepting at one small point, which led to its development and present form. I am sorry to say that some of the teeth were injured in entrusting the chiselling to a country gentleman, whose geological notions of matrix and fossil, were not matured. The teeth of this elephantine head are thought by a friend of mine, to belong to that species denominated African.

The second specimen laid before the Society, is that of a slender tusk, imbedded in the conglomerate of the river, the several pieces of which, joined together, amount to a length of five feet nine inches and a half. To what animal did this belong? The portion of tusks of elephants that we possess, being at least treble the present in circumference.

Next are drawings No. 3 and 9, frontal and base of a Buffalo skull, from the same locality; exhibiting in one, the condyles of the foramen magnum, orbit; portion of horn, and general base of the skull; the other shewing the massy forehead, (nearly eleven inches between the orbits), and angle of the horn in contrast with the Bovine skull to be noticed hereafter.

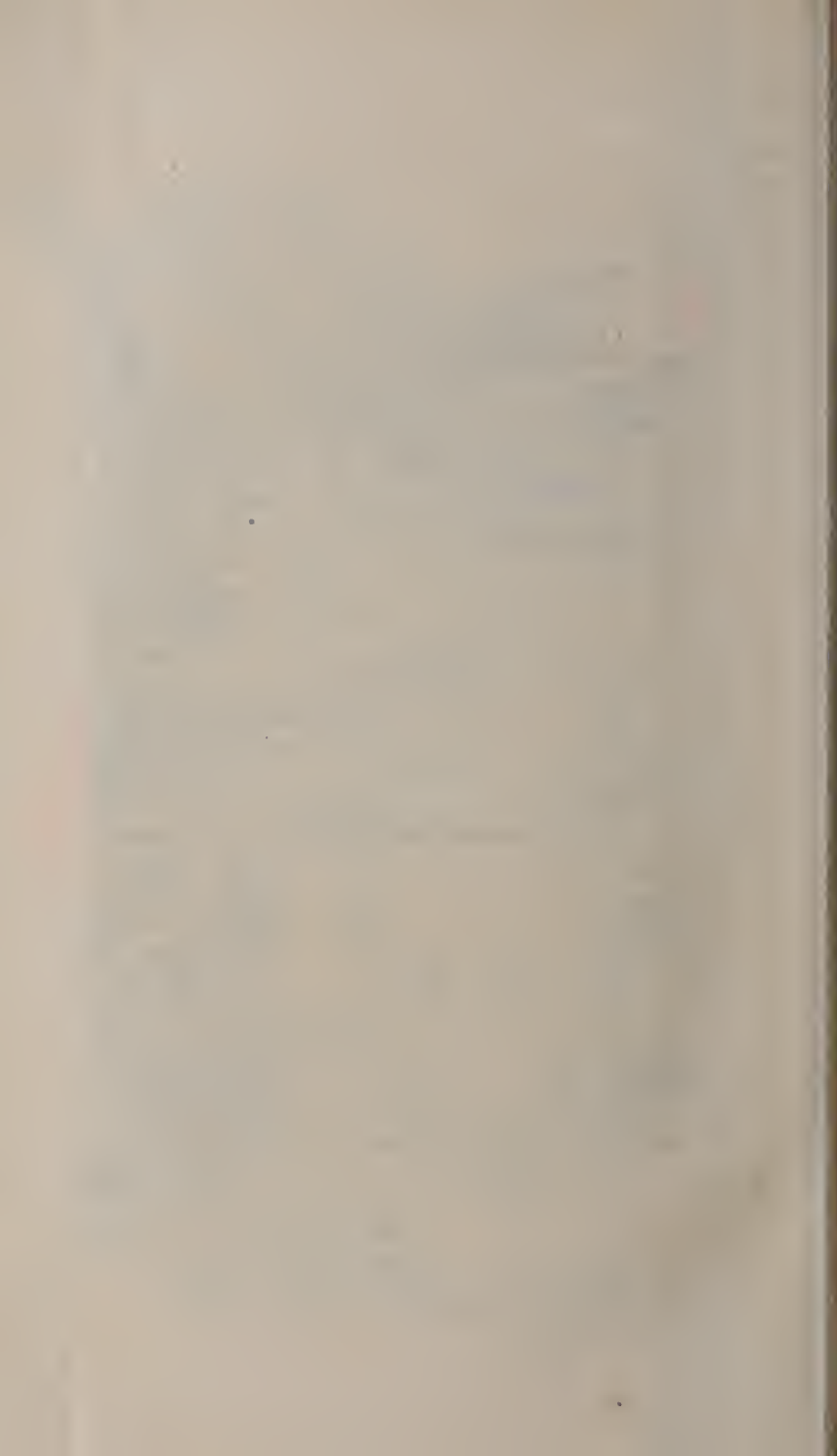
FIG. 5thFIG. 6thFIG. 7thFIG. 8thFIG. 9thFIG. 2^dFIG. 1stFIG. 3^oFIG. 4th

Don french feet of 3 feet 3 inch and 1/2 line to the metre.





Melanorrhoea usitata Willd



No. 4, are drawings of the vertebræ of the Mammoth ; the centre one, which is extremely perfect, was found imbedded in the same matrix as the foregoing, near the village of Bikore, some fifteen miles up the river from Hoshungabad. On the same paper a convex and concave view of another vertebra of considerably larger dimensions has been annexed, with their different measurements on the same scale, shewing their relative size. The latter was found in this neighbourhood.

No. 6, is portion of a ruminant jaw from near Niaghurreea, on the Barunj Nulla, and about a kos from Beltharee Ghat,* on the Nerbudda. The specimens brought in have been chiefly similar jaws and cylindrical bones of either buffalo or bovine genus. This site has not yet been visited by us.

No. 7, a drawing of a Bovine skull, exhibiting some of the molar teeth. No. 8, is a frontal view of the same. This skull was for a long time unique, and was dug up at Heerapoor, on the right bank of the Nerbudda, at the junction of our boundary and the Bhopul state ; but since this, numerous skulls from near Jhansee Ghat have been sent in ; they are characterized by very large molars, and a great squareness of the occiput, a point not shewn in these drawings ; the horn is imbedded in matrix, so that its actual circumference is not easily determined, but it appears to fall short of the buffalo skull No. 3, and as it does considerably in breadth of forehead.

No. 10, 11, 12, are specimens from Brimhan Ghat, of two skulls and a cylindrical bone. This site was first brought to notice by myself in 1833, subsequently explored by Captain M. Smith, then in charge of the Saugor district, and latterly by Mr. C. Fraser, the Agent. The chief specimen† was the head of a mammoth ; the dimensions of which, as compared with a recent skull of an animal seven feet high, were enormous. The foramen magnum of the occiput was three inches and a half ; diameter of tusk at base, six and a quarter inches ; and as it stood on the occipital condyles, the height was thirty-three inches ; breadth of the molars four inches. The fossil remains here have been chiefly those of the elephant and bovine classes.

From Brimhan Ghat, proceeding upwards, we come to Sagounee and its neighbourhood—sites from which I sent numerous specimens that have been laid before the Society, and among them a buffalo head with horns (a delineation of which was promised in my preceding communication) with one sent down by Serjeant Dean from the Jumna.

* From this Ghat, in 1834, I forwarded fossil specimens, pronounced to be those of a horse.

† It has been sent to Capt. Cautlay for comparison with those of the Sivalik range.

Our next site is Jhansee Ghat, where the bivalves (drawings of which were lately forwarded for inspection) have been found. This place and its neighbourhood has yielded a large collection of fossils, but chiefly buffalo and bovine; vertebræ and leg bones of the first, and large skulls of the latter, bearing the same character as that delineated in No. 7. From this ford all the way up the river fossils have been found. At the Jogee Ghat, three miles below Berah Ghat, the upper portion of the head of a young hippopotamus was discovered, as shewn in No. 14. The upper coloured drawing gives a view of the entire fossil on a reduced scale, and the pencil one below a profile, natural size, from the anterior to the posterior molars of the left side. This is the first and only one of the kind; almost all our collections being derived from the elephant, horse, buffalo, and latterly a large bovine class, as noticed before.

In the ravines of the Nerbudda, close to Berah Ghat a fine lower jaw of a mammoth was excavated and brought in, of which No. 15 gives an accurate facsimile, and some idea of the stupendous animal it was originally attached to.

Above Jubulpoor, as far as our present researches extend, but few fossil remains of quadrupeds have been found, the perfect head of a horse (drawings of which were laid on the table some two years ago) forming one of the few exceptions.

From Chewlea upwards, fossilized trees of various kinds and shells alone reward the zeal of the philo-geologist.

For the interesting fossil discoveries from Jubulpoor to Jhansee Ghat the lovers of this pursuit are indebted to Mr. C. Fraser, the present Agent to the Governor General in these territories, who from the time of his rejoining this agency, has been most indefatigable in bringing to light these treasures of a former age.

I cannot pass over the aid I have derived in my illustrations* of the fossils for the present notes (as well as those lately submitted of the different kinds of shells, chiefly found in these territories,) without saying how much I am indebted to the pencil of Captain Reynolds, whose kindness and readiness to devote his time and talent to the delineation of the numerous specimens sent to him, have been unwearied.

N. B. Just as the foregoing was concluded, a fossil crab was brought in from near Jhansee Ghat, a drawing, No. 16, natural size, exhibits this as yet unique specimen.

JUBULPOOR, 1st Nov., 1839.

G. G. SPILSBURY.

* No. 3 is by Mr. M. C. Ommanney—not the first instance, by many, that I have had of his ability and kindness.

ART. IV.—*Proceedings of the Asiatic Society.*

(Wednesday Evening, the 5th February, 1840.)

The Proceedings of the last Meeting were read.

His Excellency Sir Jasper NICOLLS, Commander-in-Chief, &c. &c. and Maharajah RAHMUT ALI KHAN, proposed at the last Meeting, were ballotted for, and duly elected Members of the Society.

The Society then proceeded to the election of Vice-Presidents and the Committee of Papers for the ensuing year, when the following gentlemen were chosen:—

Vice-Presidents.

The Honorable Sir J. P. GRANT.	The Honorable H. T. PRINSEP, Esq.
Colonel D. McLEOD.	The Honorable Sir H. SETON.

Members of the Committee of Papers.

W. GRANT, Esq.	Dr. D. STEWART.
Major W. N. FORBES	D. HARE, Esq.
Dr. J. McCLELLAND.	H. TORRENS, Esq.
Dr. N. WALLICH.	Dr. GRANT.

Mr. James COLQUHOUN proposed by Mr. SUTHERLAND, seconded by Dr. O'SHAUGHNESSY.

Captain SWETENHAM proposed by Major FORBES, seconded by Mr. SUTHERLAND.

C. K. ROBISON, Esq. proposed by Major FORBES, seconded by Mr. SUTHERLAND.

Mr. Thomas Charles CADOGAN proposed by Mr. BAGSHAW, seconded by Sir H. SETON.

Mr. R. H. MATHEWS proposed by Mr. BAGSHAW, seconded by Mr. H. T. PRINSEP.

The officiating Secretary informed the meeting that the Committee of Papers propose M. RENAUD as an Honorary Member, in succession to the late illustrious M. SILVESTRE DE SACY.

Read the following letter from Professor H. H. WILSON, dated East India House, 3rd December 1839, intimating his having forwarded through Messrs. ALLEN and Co. the busts of Sir W. JONES and Mr. H. T. COLEBROOKE.

East India House, 3rd Dec. 1839.

MY DEAR SIR,—I have an opportunity of acknowledging your late, as well as your former overland letter at the same time. As the letter of the 27th August reached me this morning, just in time for to-morrow's mail, there will not be time to attend to any of its contents before the dispatch is made up, but I will make the inquiries respecting the anatomical plates without delay. There would be no difficulty in printing the work altogether in this country, and both for the sake of science and my friend MODHUSUDAN GUPTA I should willingly act as editor; he would probably, however, prefer correcting his own work.

I have recently dispatched to you, through Messrs. ALLEN and Co., the busts of Sir W. JONES and Mr. COLEBROOKE, which I doubt not will afford the Society much satisfaction. The bill remitted by you of 136*l.* has been realised, but the charge is a trifle more, being 142*l.* 10*s.* including the expense of reducing the bust of Sir W. JONES from the more colossal proportions of the statue in St. Paul's, and the expense of packing. I have paid the balance. The funds you have placed at my disposal will probably allow it to be deducted from them without inconvenience, if not, I can draw upon the Society for the amount.

Mr. JAMES PRINSEP, I am sorry to state, continues in the same condition. There is no sensible improvement, but he is not apparently worse than he was six months ago.

Yours very sincerely,

H. H. WILSON

To Dr. O'SHAUGHNESSY.

Resolved—That the amount advanced by Professor WILSON, for the purposes above mentioned, be forthwith remitted to him, with a suitable acknowledgment of the trouble he has taken in forwarding the busts.

Library.

Read a letter from the Secretary to the Royal Society of Northern Antiquaries of Copenhagen, acknowledging the receipt of two specimens of ancient warlike weapons, presented by the Society through Dr. CANTON, and intimating his having forwarded several articles for the use of the Society.

*Royal Society of Northern Antiquaries,
Copenhagen, 18th October, 1833.*

DEAR SIR,—We received by Dr. CANTON your letter of 18th October last year, together with two specimens of ancient warlike weapons of copper, for our Museum. These we consider as of importance for our collection, and we shall take a future opportunity of writing more particularly on this subject. It would be very interesting if we could obtain a few more such matters of different sorts from India. Dr. CANTON is a good judge of northern antiquities, and knows what will be of greatest interest to us in a scientific point of view.

I take the present opportunity to inform you, that I have dispatched from our Society to yours the following articles, which I hope will arrive safely.

By Peter HANSEN, Esq. Chief of the Establishment at Serampore (8th November, 1837.)—

The Annals of the R. S. N. A. 1836-1837, &c.

By Capt. RABE, to the care of Colonel REHLING, Governor of Tranquebar (18th April, 1838, and 18th October, 1838.)—

1. My work entitled, "*Antiquites Americanæ*," published by our Society.
2. My Memoir, separately published in French "*Sur la déconverte de l'Amérique au dixième siècle*."
3. My general Chart or Map, in illustration of the voyages of discovery to America, performed by the Scandinavians.
4. My special Map of Greenland.
5. Sundry other Maps published by the Society.
6. Some facsimiles of Icelandic Vellum Codices (*skinnbækur*)
7. R. K. RASK's *Samlede Afhandlingar*, 3 die deel.

The great importance of the literature of India to the Scandinavian north, and conversely the importance of that of the latter to India, prompts to a more intimate connexion of our Societies.

I have the honor to be, Sir,

With sentiments of respect and esteem,

Your most obedient servant,

JAS. PRINSEP, Esq.

Secy. As. Soc. Bengal.

CHAS. C. RAFRY, *Secretary. R. S. N. A.*

Library.

Read a letter from J. P. GRANT, Esq. officiating Secretary to the Government of India, Revenue Department, forwarding the following Books:—

Illustrations of Indian Botany, No. 12.

Dr. WIGHT's Illustrations of Indian Plants, Nos. 11 and 12.

Read a letter from the Messrs. BOWDITCH, sons of the late Mr. N. BOWDITCH, forwarding for presentation the 4th volume of the "*Mécanique Céleste*, by LA PLACE," translated by their father, with a commentary.

Boston, August 18th, 1839.

SIR,—We send you, for the use of the Royal Asiatic Society, the first and last volumes of our father's commentary on the "*Mécanique Céleste*".

Before his death Mr. BOWDITCH prepared a few notes to the fifth volume, but they are imperfect, and therefore will not be published.

May we be allowed to refer to your notice the Appendix to the memoir of the translation, wherein you will find the disposition we have made of his library. In England our determination to make the "Bowditch Library" a free public institution, has been received with approbation by Sir JOHN HERSCHEL and others, and therefore we have taken the liberty of mentioning it to you.

We remain respectfully, yours,

N. J. BOWDITCH,

J. BOWDITCH,

F. D. BOWDITCH,

W. G. BOWDITCH,

Children of Nathaniel BOWDITCH

To the Secretary of the Royal Asiatic Society, Calcutta.

Resolved—That the thanks of the Asiatic Society be conveyed to the Messrs. BOWDITCH, for their valuable donation; and that the Society further offer their cordial approval of the generous resolution regarding the disposal of the Bowditch Library.

Read a letter from Major JERVIS, Provisional Surveyor General, conveying a brochure by M. REINHARD.

Bombay, 10th Dec. 1839.

SIR,—On my way through France by the overland route to this country, I was charged by my distinguished friend Monsieur REINHARD, Membre de l'Institut, to present the accompanying volume in his name to the Asiatic Society of Bengal. And although not as yet a member of your distinguished body, I venture to assure you

of the very warm interest which he and many other celebrated orientalists in France, Members of the French Institute, take in every thing connected with the objects of your Society.

I have the honor to be, Sir,

Your most obedient servant,

To the Secy. Asiatic Society.

T. B. JERVIS, Major of Engineers,
appointed Provisionally Surv. Gen

Read a letter to the President from M. DUTROUILLY, Treasurer of the Académie Royale de Bordeaux, presenting copies of the Actes de la Société, requesting the Journal in exchange, and inquiring after the state of Mr. JAS. PRINSEP's health.

Académie Royale des Sciences, Belles-Lettres et Arts de Bordeaux.

MONSIEUR,

Bordeaux, le 28 Aout, 1839.

L' Académie me charge de vous adresser les deux premiers numéros de ses Actes, elle vous prie de les offrir, de sa part, à la Savante Compagnie que vous présidez, elle se fera un vrai plaisir de lui adresser régulièrement les fascicules à fur et à mesure qu'ils paroîtront, elle espère que la Société Asiatique voudra bien lui continuer l'envoi de son journal.

L' Académie me charge aussi, Monsieur, de vous adresser un exemplaire de ses Actes, elle vous prie de l'agréer comme un hommage rendu à votre zèle éclairé pour les Sciences et les Lettres.

L' Académie a appris avec peine que l'honorable Monsieur PRINSEP l'un de vos Membres avait été dangereusement malade, comme elle n'a reçu aucune nouvelle de sa santé, et qu'elle a appris seulement qu'il avait été au Cap pour la retablir; y auroit il de l'indiscretion, Monsieur, à vous prier de vouloir nous donner de ses nouvelles. Le service qu'a rendu à la science M. PRINSEP, le rend cher à tous ceux qui la cultivent, et particulièrement à l' Académie.

Veuillez, je vous prie, Monsieur, agréer et faire agréer à la Savante Société Asiatique l' assurance de la haute considération avec laquelle J'ai l' honneur d'être.

Monsieur,

Votre très-humble et très obéissant serviteur,

DUTROUILLY,

Trésorier de l' Académie Royale des Sciences

Belles Lettres et Arts de Bordeaux.

Resolved unanimously,—That the thanks of the Society be offered to the Académie de Bordeaux, and the Journal regularly forwarded as desired. The Secretary was further instructed to communicate to M. DUTROUILLY the latest intelligence regarding Mr. PRINSEP.

The following Books were presented :—

Outlines of the Topography and Statistics of the Southern Districts of Oudh and of the Cantonment of Sultanpore, Oudh, by Dr. D. BUTTER. —by the Author.

Transactions of the Royal Irish Academy, vol. 18, in 2 parts, —by the Academy.

Description of an Observatory established at Travandrum, by His Highness the Rajah of Travancore, by John CALDECOTT, Esq. Astronomer to His Highness, —by the Author.

Annuaire des Marées des Côtes de France pour L'an 1839, publié au Dept. de la Marine. Par A. M. R. CHAYALLON.

Mémoire Sur les Divers Moyens de Se Procurer Une Base. Par A. M. R. CHAYALLON.

Nieuwe Verhandelingen der Erste Klasse. Van het Konin Glijk Nederlandse Institut, vol. 6 and 7.

Solemnia Natalitia Regis Augustissimi ac Potentissimi Frederici Wilhelmi III. ac Aug. III edited by Professor A. G. SCHLEGEL, Bonn 1839,—by the Author.

Mémoire sur le système Grammatical des Langues. Par M. P. et Du Ponceau, L.L.D.—by the Author.

The American Almanac and Repository for 1839—by the American Philosophical Society.

The East Indian Journal, No. 2, by R. C. WOODS, L.L.D.—by the Author.

A Sketch of the Argument for Christianity and against Hinduism, (*Sanscrit*) by J. MITR, Esq. B.C.S.—by the Author.

Meteorological Register for December, 1839—by the Surveyor General.

The following books were received from the booksellers:—

Journal des Savans, for May and June, 1839.

Lardner's Cabinet Cyclopædia—History; vol. 2.

Illustrations of Ornithology, by JARDINE and SELBY, purchased from a number for Co's. Rs. 100.

Literary.

Mr. Secretary PRINSEP forwarded on the part of Government the following papers for publication in the Society's Transactions, or in its Journal:—

Dr. J. W. HELFER's third and fourth Report on Tenasserim, the surrounding nations, inhabitants—natives and foreigners, character, morals and religion.

Dr. RICHARDSON's Proceedings on his Mission to Siam and the Shan states, with a Map of Siam.

Dr. CAMPBELL's Notes on the Mechi, with a Vocabulary of their language.

The officiating Secretary apprized the Meeting of his having received from Lieut. T. HUTTON the first part of his "Journal of a trip through Kunawur, Hungrung, and Spiti," to the expenses of which the Society had contributed a sum of 1000 Rs. pursuant to the resolution passed at the Meeting held on 1st Nov. 1837, (J. A. S. vol. 6 p. 898.)

Mr. J. W. LAIDLAY forwarded a paper on Mohammedan Coins.

Museum.

The officiating Secretary then requested the attention of the Meeting to a very important dispatch recently received from the Court of Directors.—This dispatch rendered it necessary to assign 250 rupees per mensem to the salary of a Curator.—The Committee of Papers had taken the subject into their serious consideration, and their Minutes are accordingly appended to the official letter.

To W. B. O'SHAUGHNESSY, Esq. M.D.

Officiating Secretary to the Asiatic Society.

No. 1280.

General Dept.

Letter from the Honble. Sir E. RYAN, Kt. President of the Asiatic Society, dated 21st June, 1837.

Ditto to ditto, dated 28th June, No. 261.

Ditto from Secretary Asiatic Society, 10th July.

Ditto to ditto, dated 26th ditto, No. 328.

Ditto from ditto dated 12th ditto, 1838.

Ditto to ditto, dated 18th ditto, No. 844.

(Para : 81 to 87)

SIR,—With reference to the correspondence noted in the margin, I am directed to transmit to you for the information and guidance of the Society the accompanying Extract from letter No. 17, of 1839, from the Honorable the Court of Directors, in the Public Department, dated 18th September.

I am, Sir,

Your most obedient servant,

COUNCIL CHAMBER,
26th December, 1839.

H. T. PRINSEP,
Secy. to Govt. of India

Extract from letter No. 17 of 1839, from the Honorable the Court of Directors in the Public Department, dated the 18th September.

Applications from the Asiatic Society of Calcutta to the Government for assistance.

Letter of 30th Aug. 1837.

Forwarding correspondence with Sir Edward Ryan, the President of the Society, soliciting the aid of Government to the amount of rupees 200 per mensem, in maintaining the museum of antiquities and natural history already commenced by the Society, but which must fail without such aid; also requesting permission to purchase antiquities, manuscripts, and objects of natural history and science to the extent of rupees 800 per mensem, on the engagement that the objects shall be placed at the disposal of the Government if the Court should decline to sanction the measure. The subscription of rupees 200 per mensem was sanctioned, and it was intimated, with regard to the latter application, that the Government declined a fixed grant, but would be ready to receive recommendations for the purchase of objects of more than common interest.

Letter of 12th Sept. 1838.

Reporting that the Government had acceded to the application of the Society by giving retrospec-

Para. 81. Your letter of the 30th August, 1837, for wards an application from the Asiatic Society of Calcutta soliciting the aid of the Government for the extension and maintenance of their Library and Museum, submitted to you with a letter from Sir E. Ryan, the President of the Society.

82. The objects of the Society, as set forth in their resolution of the 7th June, 1837, and their President's address, are the means of providing for the services of a professional naturalist to superintend and systematize their collections—of defraying the cost of preserving—and displaying the collections of curious and instructive articles already made—and of procuring additional objects illustrative of the geography, antiquities, statistics, mineralogy, conchology, botany, and natural history of India. In order to accomplish these purposes they estimate that in addition to their own available resources an annual expenditure of 10,000 rupees is necessary. Although however specifying this sum as the amount of the aid which they are desirous of receiving, they leave it to you to fix the extent of any grant which you may deem it expedient to afford.

83. In your reply to the President of the Society you acknowledge the claims of the Asiatic Society of Bengal to the gratitude of the public, both in Asia and in Europe for the persevering and successful efforts it has made, for more than half a century, to investigate and illustrate the literature, science, and natural and artificial production of the East. You recognize the advantages which may

ive effect to the monthly allowance of rupees 500 granted by the Court for the publication of oriental works, as the Society had published several works before the receipt of the Court's sanction, and had thereby incurred a debt of rupees 2,500.

be expected to result from the extension of the Society's Library and Museum, and you admit the impossibility of this extension being effected, unless the Society be aided liberally by the Government, in like manner as similar institutions in Europe are supported by the Public Treasury. At the same time you declare yourselves precluded from giving an immediate sanction to the specific

annual grant suggested by the Society in this instance, without previous reference being made to us, engaging to support such reference with your recommendation.

84. In a subsequent address from the Society, dated 10th July 1837, you were solicited, pending the result of the reference to us, to assist the Society with a monthly grant of 200 rupees, and a further sum of 800 rupees, a month, for the purchase of additions to the Library and Museum, on the condition that if the disbursement should be disapproved of, the articles so purchased should be relinquished to the Government. With the first of these requests you complied, but declined to make any specific appropriation of funds for the objects proposed in the latter suggestion, although you stated your willingness to receive from the Society recommendations for the purchase, or other procurement, of such articles as the Society might think it desirable to possess, and provided they were not of a perishable description.

85. The independent and useful activity of the Asiatic Society of Bengal during so long a period, entitles it justly to your consideration, and looking to it as the only institution in India, which offers any analogy to the great national libraries and museums of Europe, it is a legitimate object of public support. We therefore approve of the aid and encouragement which you have given. We think, however, that the extent to which you have gone is fully adequate to all purposes of public utility. The Society is already in possession of a library and museum of some extent, and the additions that may be made to either must be occasional and progressive. It does not happen in India as in Europe, that large public or private collections of a rare and valuable description are offered for sale, and all accessions which the Society will have an opportunity of acquiring must be of limited extent and incidental occurrence. From the character too of the persons who are likely to contribute to the Society's collections, it is very improbable that a pecuniary equivalent will in all cases be desired, and it seems to us, on various grounds, unnecessary and objectionable to assign to the Society a permanent grant for the purpose of effecting occasional purchases. When an application from the Society comes before you for any definite outlay, it will be time enough to take into consideration the expediency of granting the particular assistance that may then be required. We shall not object to your granting to the Society funds for special purchases, as occasions arise, as far as may be compatible with a due regard to public economy. On all such occasions, you will forward to our Museum a selection from the articles which may have been so procured.

86. The more immediate and permanent want of the Society is the superintendence of a qualified person to preserve its collections, and arrange them in a scientific and systematic manner, so that they may be readily consulted, and be at all times subservient to the diffusion of useful knowledge; such a person may no doubt be met with at the Presidency, and we do not object to your allowing to the Society the monthly sum of 200 or 250 rupees as the salary for his services, with a further sum of 50 rupees a month for the cost of preparing specimens, and maintaining the

collections in order. It would however be an unprofitable waste of money to attempt the preservation of many of the objects of natural history in the climate of Bengal, and these when considered valuable should be transmitted to our Museum.

87. We do not object to the retrospective effect given to the appropriation of 500 rupees a month for the publication of oriental books, under the circumstances stated; and we take this opportunity of intimating our wish, that as soon as the work in hand shall have been completed, arrangements should be adopted for applying the grant to the printing of the text of the Vedas, with a commentary, as the oldest and most authentic record of the language and religion of the Hindus, and therefore indispensable to the history of opinion and of man.

(True Extract)

H. T. PRINSEP,

Secretary to the Government of India.

Minute by Sir EDWARD RYAN.

It appears from the copy of the dispatch of the Court of Directors, communicated to the Society by the direction of Government, that 200 or 250 rupees are to be allowed monthly to the Society for the salary of a qualified person to preserve its collections, and arrange them in a scientific and systematic manner, and an additional 50 rupees a month for the cost of preparing specimens, and maintaining the collections in order. I think it is desirable that the Society should state the time they will require any Curator they may appoint to devote to his charge, and the periods at which he should report to the Society upon the state and condition of their Museum. I think upon the fixed salary that will now be devoted to the person, that the Society might reasonably expect two or three hours in each day shall be devoted to the Museum—that reports should be made at each monthly Meeting—and the office of Curator should be held, like most of the offices of the Societies, for the year only; that is, subject to annual re-election. If the Society approves of the conditions there named, I would further propose, that the office of Curator be offered, in the first instance, to Dr. M'CLELLAND, who has so kindly, for some time past, discharged the duties of Curator without salary. If he will accept, the office, I am sure the Society will be happy to avail itself of his most valuable services. I beg our Secretary to circulate with Mr. Secretary Prinsep's letter and enclosure this memorandum.

EDWARD RYAN.

January 25th 1840.

Circular from officiating Secretary, to the Committee of Papers, Asiatic Society.

GENTLEMEN,

I beg leave to circulate an important dispatch from the Honorable the Court of Directors, regarding our Museum, and directing a salary of 250 rupees per mensem to be paid to the Curator. I also circulate a Minute on the subject by our President.

I take the liberty of expressing my concurrence in the opinions of the President, and at the same time my hope, that Dr. M'CLELLAND may be enabled to command sufficient leisure for the duties of the office. It is quite impossible at present to find a competent and available individual to fill Dr. M'CLELLAND's place. The accomplished officers who have recently entered the service (I allude chiefly to Drs. WALKER, JAMESON, and CANTOR) are too eagerly sought for by the Government for scientific missionary duties to justify our indulging the least hope of their being soon placed in Calcutta.

I am satisfied, at the same time, that should Dr. M'CLELLAND feel his time pre-occupied to such an extent as to prevent his attending closely to the Museum, he would be the first to propose measures for the securing the entire services of a competent person. I think with the good salary we are now enabled to offer, that we can very easily procure such an individual from England. I accordingly propose,—

1. That in the event of Dr. M'CLELLAND declining the curatorship on the terms allowed by the Honorable Court, and under the stipulations of our President, the Committee of Papers address (through the President) an application to the proper scientific personages at home, requesting their selection and appointment of a competent naturalist for the office of Curator on a salary of 300*l.* per annum.

2. That the Committee of Papers at the same time forward a memorandum of the Curator's duties.

3. That the person appointed in England be bound to serve the Society for five years.

4. That an outfit allowance of five hundred rupees be allowed him, and his passage paid for, and that the necessary funds for these expenses be provided by allowing the Honorable Court's monthly donations to accumulate from the date on which these resolutions may be agreed to, until the arrival of the Curator.

5. Lastly, that these resolutions be submitted to the consideration of the next general meeting, with the recommendation of the Committee in their favor.

Your's faithfully,

26th January, 1840.

W. B. O'SHAUGHNESSY.

Minute by Dr. M'CLELLAND.

Having fully considered the responsibilities of the office of Curator, I shall be happy to continue to discharge its duties, if it be desirable to the Society I should do so.

As the Museum of Natural History at the India House is alluded to in the Court's dispatch, I take the liberty of putting into the circular a letter from Dr. HORSFIELD, the superintendent of that collection, by which it will be seen that the Court of Directors are promoting at the India House the very same object that we have here in view, in endeavouring to establish a collection of natural objects.

Under these circumstances, it will no doubt be agreeable both to the objects and wishes of the Asiatic Society, to promote as much as possible, without detriment to our own Museum, the objects of the home collection, with which view the grant of 200 to 250 rupees as salary to a Curator, seems partly to have been made.

In my opinion the great, and indeed the only security the Society can possess in regard to a Curator, is scientific reputation; for without acquirements of a high order as a naturalist, (by which I do not mean a stuffer, nor the mere namer of objects) his assiduity would be of no avail, while his monthly reports, were he to engage to supply them, might bring discredit on the Society.

It is for these reasons, and because of a want of confidence in my fitness for an office so interesting and important as our curatorship is now likely to become, that I cannot enter into any engagements as to periodical reports, or hours of attendance.

We may at present have few in Calcutta qualified for the office, but of the number of eminently qualified individuals who have recently entered the Medical Department, we may hope that ere long the services of some of them will be required in Calcutta,

when our Museum will have the aid of curators of far higher qualifications than the Society could obtain from Europe for any small sum we can ever hope to be able to offer

29th January, 1840.

J. M'CLELLAND.

P. S.—I was afraid that in sending home for a Curator it might be forgotten that we have eminently qualified persons in India, and am therefore the better pleased to find that since my remarks were circulated, the names of three to whom I particularly alluded, have been incorporated in the Secretary's Minute. I am however, very sanguine as to soon seeing several qualified scientific men in Calcutta, for offices of this nature.

J. M'CLELLAND.

Minute by Mr. H. T. PRINSEP.

I wish to see this question fairly discussed at the meeting on Wednesday next. I see no other arrangement that can be proposed, except to place Dr. M'CLELLAND in the office for the coming year; but I think unless he will pledge himself to daily attendance, and monthly reports, that he should be considered, as he himself suggests, as officiating until we can find a qualified person who will give more time to it.

I think with him, that it will be preferable to look out for a Curator amongst the highly qualified persons we have in India, rather than take the chance of obtaining a good man from England. 300*l.* per annum, or 250 per mensem, is not enough to satisfy a man of science. Indents for Editors, and even for Schoolmasters, from Europe, have not ordinarily been successful.

H. T. PRINSEP,
D. STEWART,
W. N. FORBES,
D. McLEOD.

30th January, 1840.

On the day of the meeting Dr. M'CLELLAND submitted the following additional Minute.

As the Museum at the India House is alluded to in the dispatch of the Honorable the Court of Directors, No. 17 of 1839, dated the 18th September, the following remarks on that collection is extracted from a private letter addressed by Dr. HORSFIELD to Mr. M'CLELLAND, Bengal Medical Service, dated Library, East India House, August 31st, 1839.

"The Museum itself is not very extensive, but it is nevertheless of much importance in connexion with Indian zoology, as it contains several extensive local collections.

"It consists mainly of the following Faunas, which are more or less perfect:—

"*Firstly.* A collection of upwards of 200 species of birds from Java, and a proportional number of quadrupeds. This was formed by myself, and brought to England in 1819, when it constituted the nucleus of our Zoological collection.

"*Secondly.* We have a pretty complete series of Birds collected in Sumatra by Sir STAMFORD RAFFLES, and some of his Mammalia.

"*Thirdly.* We have a similar collection made by the late Dr. FINLAYSON in Siam and in the Indian Archipelago.

"*Fourthly.* We have a nearly complete series of Mammalia and Birds collected by Colonel SYKES in the Dekun, of the importance and extent of which you can judge by the respective catalogues contained in the Proceedings of the Zoological Society for 1831 and 1832.

"*Fifthly.* We have a few specimens from China, Nepal, and the Upper Provinces of Bengal, but these are imperfect and fragmentary.

"To these has now been added a series, almost complete, of the Mammalia and Birds collected by yourself in Assam, which have been mounted, and form a valuable addition to the specimens exhibited in our Museum.

"All these separate Faunas are neatly arranged in our natural history department, which consists of a large room well lighted, and provided with excellent cabinets for the preservation of the subjects.

"This Museum I may say is established on a modest scale, and without the pretension to extent or elegance of the national collections (such as the British or Hunterian, or even the Zoological Societies) but our specimens are generally good, being prepared by the best London artists, and my endeavour is to have them correctly labelled.

"Our collection consists mainly of Quadrupeds and Birds; but we have also a small collection of Fishes, Reptiles, and Serpents, which have recently been examined by Dr. CANTOR, who has prepared a list of them, agreeably to which they are arranged.

"It is my intention as soon as possible to prepare a general list of the Mammalia and Birds which are arranged in our Museum for transmission to you, so that you may form an accurate idea of what we have, and be enabled to judge of what we want.

"I have no doubt the nature and importance of natural history is more considered and appreciated now, than it was in former times; and I cherish the hope that the countenance and support of Government will ere long be extended to it in an effectual way; but this I can at present only allude to as a wish or expectation. Meanwhile I may enumerate some of the subjects which would be particularly desirable. We want, for instance, many of the birds of Bengal. All the rarer species, and some of the more common (of these I hope soon to send you a provisional list); we want generally the Birds of Silhet, the Garrow Hills, Tenasserim, Arracan, Burmah, &c. &c. and duplicates of the new and of all the rarer species discovered by you in Assam.

"We want a complete series of the Birds of Nepal, also Mammalia; the smaller species would suit our purpose best, as we can more easily accommodate them. But above all, and especially, we want a large, full, and complete collection of all the *Vespertilionidæ*, or *Bats* of India. This is the most important family, as it has never been sought after; and I beg and entreat you to have a large collection made generally throughout all India; and I need not point out to you the localities where these animals are most likely to be met with."

Here Dr. HORSFIELD enters into particulars regarding the genera and species.

"But besides these it is in the branch of *Entomology* that I would at present strongly solicit contributions to the Company's Museum. I am more anxious on this head, as I have succeeded in bringing an extensive collection of Insects from Java in excellent condition, and with the exception of these, and the collection of Colonel SYKES, we have absolutely nothing from Bengal or from India generally." On this subject Dr. HORSFIELD delicately alludes to the probability of gentlemen connected with

missions still holding collections of Insects unappropriated, under the supposition, perhaps, that such objects would be less appreciated than the large animals; on the contrary, Dr. HORSFIELD states that contributions to this department of the Museum would be as likely as any other means to promote the interests of science, and to secure the approval of those who are interested in the collection at the India House.

With regard to Insects. The public collections which remain, I believe, unappropriated, are those made by Dr. WALLICH, Mr. GRIFFITH, and myself, when employed on the Assam deputation, and Dr. HELFER's collection. That which was made by the Assam deputation is still, I believe, at the Botanic Garden, and like Dr. HELFER's collection has not yet been transferred to the Government. With regard to the former, perhaps the Society has no authority to interfere; but as the Society has been authorized to take one series of Dr. HELFER's collection for our own Museum, and to select another for that of the India House, it might be necessary to address Dr. HELFER on the subject, particularly as his collection of birds for the Honorable Court has been packed up for some time in the Museum, and are only detained till the insects which have not yet been submitted to the Society should accompany them.

The large collections of birds and insects made by Captain PEMBERTON during his mission to Boutan, and the officers who accompanied him on that occasion, have been long almost unobserved in the Museum, owing to the late repairs of the house. The greater part of the birds composing that collection were previously in our possession, but such as were new to it were transferred to our cabinets, and the rest enclosed in cases for transmission to the India House. The insects of the same collection which are numerous, and no doubt rich in undescribed forms, are also in course of being dispatched with the birds; a series having been reserved for our own collection. The pains taken during Captain PEMBERTON's Journey, to mark the localities in which the different objects were collected, cannot be too highly applauded, especially as this very important circumstance has been hitherto altogether neglected on such occasions.

Mr. LYELL in a letter addressed to Mr. M'CLELLAND, dated 7th September 1839, states, that he is very anxious for accurate information respecting the geography of living *testacea* and Indian *tertiary* shells, and if furnished with duplicates from the Museum of the Asiatic Society, proposes in return to supply the Society with fossil and recent shells in exchange.

The Society, it is to be regretted, has few fossil shells from Indian beds, and a very imperfect collection of recent species. Indeed the little attention that has been paid to these important subjects in India, seems to have induced collectors to send their contributions elsewhere. Several members, and others interested in the advancement of science, are most favourably placed on the Malay coast, at various points from Chittagong to Mergui, and we may look, I trust, with confidence for large collections from this quarter in the peculiar department alluded to. I have myself been already indebted for a miscellaneous collection of shells from Dr. HELFER, and slight contributions have been made to our Museum from time to time by different individuals; but I question if we have as yet a tenth part of the species of the Bay, while we are altogether without the corals, polypes, and radiata, so abundant in all the Eastern seas.

Mr. A. P. PHAYRE, assistant to the commissioner of Arracau, kindly sent me some time since a few interesting specimens of the rocks in the vicinity of Akyab, which are perforated to the height of six feet above the greatest elevation of spring tides, the same as beneath the level of the water, by a species of *Pholas*. Mr. PHAYRE justly

describes this to a change of level in the rocks composing this part of the coast, and regards the perforations as identical to those which have been observed in the sandstone at Cherra Ponji. With regard to the Cherra Ponji rocks, I am indebted to Mr. H. WALKER for an observation of very great importance when observing the number of *Echinidæ* in my collection from that quarter; he suggested the probability of the elongated moulds contained in what seemed to be perforations, being nothing more than the spines of a *Cidaris*, a species of *Echinus*. On this subject, as well as the *Echinidæ* generally, which I find to be very abundant in the Cherra beds, I hope soon to have a communication to make, being now employed in an examination of the Indian species, particularly those which I have found fossil.

These departments of the animal kingdom are of the more importance to our collections, as we can hardly advance a single step in geology until our cabinets are complete, or nearly so, in recent species.

Mr. PHAYRE has liberally undertaken to collect for us at Akyab, but we require equally zealous correspondents at Chittagong, Kynk Phyu, Sandoway, Moulmein, Mergue, and at all the different stations along the coast, before our Museum can be considered in a progressive state.

With regard to fossil species, our collection is equally defective; indeed so long as we are without a complete collection of recent shells, fossil species would be of little interest in our Museum. As a proof of the poverty of our collection, I may remark, that of one striking and numerous family, affording probably some hundred species, most of them found in the Indian seas, yet *two* species only are all we have in our Museum, and these from unknown localities, probably New South Wales.

As animals of this family have been found in a fossil state, in a bed of sand, reposing beneath the common soil of the Sylhet mountains, under circumstances which we are bound to investigate, the fact may induce those who reside along the coasts above alluded to, to contribute their share towards the inquiry by forwarding specimens of them to our Museum. The dried testa of *Echinida*, called *sea-eggs*, are very abundant, I understand from Captain BROWN, on the shores of Rambree Island, and all the islands from thence to the Straits, while the living animals usually named sea-hedgehogs, from the number of spines with which they are covered, may be had from rocks in the same vicinity. The bleacher shell is seldom perfect, so that the living animals when put fresh into spirits form the more valuable specimens; but from the ease with which the former may be collected and preserved, as well as from their beauty as mere ornaments, they ought to form a portion of every collection, and from the philosophical interest of the subject they would be a welcome addition to our Museum.

Enough I trust has been said to induce residents on the Malay coast and other situations where similar facilities are afforded, to enable the Society to avail itself of the offer of Mr. LYELL, and at the same time to enlarge, or rather form its own collections of Indian species.

The interest now awakening in Europe regarding the natural history of this country, is calculated to produce a more powerful effect in exciting a spirit of inquiry here, than any arguments that could be urged on the spot. Thus, we have not only a Museum at the India House, now opened for the exhibitions of animals collected in India, but the first philosophers are ready to co-operate with us and aid our inquiries.

In addition to the instances of this kind already referred to, Mr. E. CHARLES-WORTH and Mr. S. V. WOOD have each presented us with collections of tertiary shells,

to facilitate our examination of the Cherra fossils. With a similar view Professor REINHARDT has presented the Society (through the medium of Dr. CANTOR, by whom they have been safely conveyed from Denmark to our Museum free of expense) with the valuable collection of skulls of *Cetacea* from Greenland, now on the table, to facilitate the examination of the fossil Mammalia that abound in several districts of India.

We cannot however flatter ourselves that any results we have yet attained are such as to entitle us to the aid of naturalists in Europe. I therefore refer the interest which the above marks of attention betoken in favor of our scientific movements, to the personal influence of one of our members, Dr. CANTOR, who has recently returned from Europe, where he met a reception for his labors among us, from philosophers of every rank, of which he may well be proud, and which cannot fail to produce a powerful effect on his future career in India.

Our scientific progress will however depend so much on the cultivation of a general intercourse with scientific individuals and Societies in other parts of the world, that we ought to take advantage of the occasion by meeting the views of those who are desirous of exchanging collections with us.

Indeed to attempt to establish a national Museum in India without this kind of co-operation, would be to reject what has been done in Europe, and to begin the study of the physical sciences as if nothing had been accomplished beyond the few scattered publications that reach India. It is by cultivating an interchange with other Museums, and thus introducing the known species of other countries as the standard of comparison for the elucidation of the unknown species of this, that we are to advance our own collections, and contribute most effectually to the general diffusion of knowledge, and the progress of science.

5th February, 1840.

J. McCLELLAND.

Dr. McCLELLAND then rose and addressed the meeting regarding the attendance of the curator for two hours a day, and a monthly report on the Museum, as insisted upon in the minute of the President, which he objected to. He objected to any stipulated period of daily attendance beyond what might be necessary to superintend the persons employed in the Museum, and of this the curator himself should be supposed the best judge. He has been in the habit of devoting more time than two hours, he might say even five hours, daily to the duties of the Museum, but that was at his own house, where he had painters and other facilities which the Museum did not afford, and where he would continue to employ himself pretty much in the same way whether appointed curator or not. As to reports, he also thought these should be left to the discretion of the curator, as it would be useless reporting unless there should happen to be something of interest to report about.

SIR EDWARD RYAN said, that he thought Dr. McCLELLAND did not quite understand him by two hours a day; he did not mean that two hours should be given every day, but that if he could not give one, four hours could be devoted to it the next, and so on, only that on an average two hours daily, whether at home or at the Museum, should be required by the Society from the curator.

As to monthly reports, it was not absolutely necessary that a long report should be furnished every month; for some months there might not be any thing to report, when only a letter stating this circumstance would be all that would be required. Monthly reports were only necessary as public records for future reference for a history of the Museum, and also that they might have something which they could produce if called

on by the Government for the expenditure of the sum granted by the Honorable Court for this express purpose. He therefore begged to propose that the office be offered to Dr. M'CLELLAND on these stipulations, if he chose to accept of it.

Mr. H. T. PRINSEP thought it necessary to inquire, with reference to Dr. M'CLELLAND's explanation of his views of the nature of a curator's office, whether it was intended to recognize the curator as entitled to remove to his own house any objects of natural curiosity or other articles he might desire. He thought that the recognition of such a privilege was inconsistent with the object of preserving always at hand for inspection every article obtained. He wished the rules of other Museums should be referred to, for of course it would be expected now that the Honorable Court had specifically assigned a sum for its maintenance, that the Society should conform to the practice of other similar institutions in Europe. Of course on the first arrival of any article, before it was classed and located in the Museum, the curator might do whatever was necessary to examine and test it, carrying it away if he pleased for the purpose. But when once placed in the Museum, Mr. PRINSEP thought the articles ought not on any account to be removed, and the rooms of the Society afforded facilities sufficient for copying and comparing in them, without any removal being necessary.

Sir E. RYAN then moved that the Committee of Papers be instructed to draw up rules on which the curatorship should be held, with the stipulation that two hours a day at least be allotted for the duties of the office—that reports be furnished monthly of the state of the Museum—and that no specimens be allowed to be removed from the Society's apartments. Similar rules in fact have invariably been observed by other Societies. The President further suggested, that the Committee do make their report on it at the next meeting. Dr. M'CLELLAND then said, that if it was intended that these rules should be strictly enforced, it would be the means of greatly limiting the endeavours of the curator, whoever he might be, for the interests of the Society; and he thought it as well, under these stipulations, to decline accepting of the situation.

Sir E. RYAN added that the Society were so sensible of the value of Dr. M'CLELLAND's services, that no decision would be formed on his expressed refusal of the office until the next meeting.

The annual Report was then presented by the officiating Secretaries, but reserved for perusal at the next meeting.

The following letters from Dr. CANTOR were read.

SIR,

Calcutta, January 25, 1840.

I take the liberty to call your attention to the following extract of a letter which I have received from Prof. REINHARDT, Superintendent of the Royal Museum at Copenhagen.

"In the year 1823 or 1824, I presented a number of stuffed specimens of European, (mostly northern) birds to the Asiatic Society, Calcutta. From a Calcutta Journal I have learned, that the specimens had arrived in fine condition, and that the Society at their monthly meeting were pleased to pass a resolution, that a number of their duplicates of Indian birds were to be presented to me in return. I have however since then neither heard any thing concerning this matter, nor have I received the gift of the Society. If you therefore on your return to Calcutta could procure some informa-

tion as to what course has been pursued after the Society had passed the resolution, I shall feel much obliged.”*

I beg leave to request that you will favour me with such information upon the subject as shall enable me to comply with the request of Professor REINHARDT.

I have the honor to be, Sir,

Your most obedient servant,

THEODORE CANTOR.

To the Curator, Asiatic Society's Museum.

SIR,

Calcutta, January 25, 1840.

In a letter from the Secretary, bearing the date of October 31st, 1837, Mr. JAS. PRINSEP expressed the Society's wish, that on my arrival in England I should purchase such works upon natural history for the Society as were most wanted in their library. To the number of works upon natural history which I have ordered Messrs. ALLEN and Co. to procure and dispatch to the Society, I beg to add the accompanying work upon *Infusoria*, by Professor EHRENBURG.

In the above mentioned letter, the Secretary further requested me to take charge of two duplicates from the Society's Museum, viz. a skull of an elephant, and a ditto of a rhinoceros, with a view to procure in exchange for those objects others, which from the knowledge I had obtained by arranging and making a catalogue of the Museum, I should conceive to be acceptable.

From Professor REINHARDT, Superintendent of the Royal Museum at Copenhagen, I have received in exchange the accompanying series of osteological preparations, which with the annexed list I have the honor of laying before the Society. The collection consists chiefly of northern Cetacea, a class of animals, which, from their locality, belong to the rarer objects in the European Museums, and which I conceive of double interest to our Museum, as affording means of comparison to students of the fossil Cetacea found in the Himalayan beds.

I have the honor to be, Sir,

Your most obedient servant,

THEODORE CANTOR.

List of osteological preparations received from the Royal Museum at Copenhagen, in exchange for two skulls from the Asiatic Society's Museum.

- | | | |
|-----|----|------------------------------------|
| No. | 1. | Canis lagopus, |
| „ | 2. | Ursus maritimus, |
| „ | 3. | Phoca hispida ♂ Adult, |
| „ | 4. | Phoca grœnlandica ♂ Old, |
| „ | 5. | Ditto ♀ Adult, |
| „ | 6. | Phoca vitulina ♂ Old, |
| „ | 7. | Ditto ♂ Young, |
| „ | 8. | Phoca barbata ♀ Adult, |
| „ | 9. | Cystiphora (Phoca) cristata ♂ Old, |

* Note by the Curator. The articles intended by the Society for Professor Reinhardt were made over to Dr. Wallich, I believe, who undertook to have them conveyed to Copenhagen.

- „ 10. Ditto ♀ Old,
 „ 11. Ditto ♂ Young,
 „ 12. Ditto (6 months old,)
 „ 13. *Trichechus rosmarus*. Adult,
 „ 14. Ditto Young,
 „ 15. *Delphinus phocæna*, Adult,
 „ 16. Ditto Young
 „ 17. *Delphinus globiceps*. Old,
 „ 18. *Delphinus* (*Delphinopterus*) *albicans*.

The specimens were procured in Greenland.

THEODORE CANTOR.

To the Curator, Asiatic Society's Museum.

We have been obliged to forego our intention of publishing COLONEL LUARD'S admirable sketch of the explosion of the "Equitable," it being quite impossible in Calcutta to communicate its effect by a stone drawing.—EDS.



Day of the Month	Moon's Phases	Minimum Temperature observed at Sun-rise.					Maximum Pressure observed at 9 a. 50 a.					Observations made at Apparent Noon							
		Barometer.	Temperature.			Wind.	Aspect of the Sky.	Barometer.	Temperature.			Wind.	Aspect of the Sky.	Barometer.	Temperature.			Wind.	Aspect of the Sky.
			Of the Mer- cury.	Of the Air.	Of an Evap- Surface.				Of the Mer- cury.	Of the Air.	Of an Evap- Surface.				Of the Mer- cury.	Of the Air.	Of an Evap- Surface.		
1		30.071	59.4	51.0	52.4	Calm.	Clear.	100	64.5	70.0	65.2	N.	Clear.	29.980	65.8	71.5	65.8	N.	Clear.
2		066	62.9	55.2	56.9	Calm.	Clear.	119	66.0	73.5	67.0	N.	Cirro-Strati, lightly interspersed.	30.102	66.5	74.2	68.0	N.	Cirro-Strati partially.
3		142	61.5	60.0	59.5	N.	Cirro-Strati.	202	65.5	65.5	61.2	N.	Cloudy.	178	67.6	71.0	65.2	N.	Clear (Cirro-Strati partially.)
4		108	61.6	56.0	56.8	N. W.	Clear.	130	66.0	70.8	66.9	N. W.	A few frags. of Clouds.	124	68.9	74.0	68.3	N. W.	Clear.
5	●	066	60.7	55.2	55.0	Calm.	Cirro-Strati.	102	64.5	70.0	64.5	N. W.	Clear.	089	65.5	72.8	65.2	N. W.	Clear.
6		087	59.6	52.0	52.0	Calm.	Clear.	124	64.3	67.2	62.2	N.	Clear.	102	66.7	72.9	61.5	N. W.	Clear.
7		102	57.5	52.0	52.0	Calm.	Clear.	182	64.0	68.9	62.9	N. W.	Clear.	148	67.0	73.0	64.1	N.	Clear.
8		058	56.6	50.8	51.0	Calm.	Clear.	104	64.2	67.0	62.2	N. W.	Clear.	082	66.5	74.5	66.0	N. W.	Clear.
9		036	56.7	51.0	51.5	Calm.	Clear.	070	64.3	70.6	64.9	N.	Clear.	048	66.5	74.5	66.0	N.	Clear.
10		070	57.0	50.2	51.0	Calm.	Clear.												
11		090	62.2	52.5	52.5	Calm.	Clear.	126	65.0	68.9	64.0	N.	Clear.	091	67.4	75.2	67.2	W.	Light Cirro-Stratus.
12	)	084	60.8	52.0	52.2	Calm.	Clear.	124	64.8	66.5	61.4	N.	Clear.	088	66.5	74.0	66.6	N.	Clear.
13		080	61.5	52.5	53.0	Calm.	Clear.	128	65.0	72.5	65.5	N.	Clear.	113	68.9	76.2	66.9	W.	Clear.
14		100	63.0	53.0	53.5	Calm.	Clear.	170	65.9	71.5	65.0	N. W.	Clear.	144	68.5	77.9	68.0	N.	Clear.
15		080	58.8	51.0	51.9	Calm.	Clear.	136	66.5	71.0	63.5	N. W.	Clear.	102	67.9	75.0	65.2	N.	Clear.
16		042	59.5	50.5	50.5	Calm.	Clear.	080	65.6	70.9	64.5	N.	Clear.	069	68.0	76.8	67.1	N.	Clear.
17		035	59.8	50.9	51.8	Calm.	Clear.	100	67.0	70.0	66.0	N. W.	Clear.	074	68.3	75.6	67.1	W.	Clear.
18		070	64.5	56.0	56.0	Calm.	Clear.	107	66.7	73.7	67.3	N. W.	Clear.	090	69.5	79.0	70.8	N.	Clear.
19	○	092	66.0	57.5	59.0	Calm.	Light Fog	156	66.9	73.8	67.8	W.	Clear.	112	69.0	79.6	71.0	N.	Clear.
20		094	66.6	58.0	59.0	Calm.	Clear.	140	70.0	73.7	68.0	N.	Clear.	122	72.9	81.2	73.2	E.	Clear.
21		070	65.6	61.5	63.0	Calm.	Foggy.	132	69.5	72.8	71.6	S.	Clear.	101	75.3	81.2	73.9	S. W.	Clear.
22		040	67.7	60.8	62.0	Calm.	Very light Fog.	050	70.8	80.0	73.2	N.	Clear.	040	74.0	81.5	75.2	N.	Clear.
23		000	67.5	60.6	61.9	Calm.	Clear.	034	72.7	79.9	73.0	W.	Clear.	016	75.1	83.5	75.3	W.	Clear.
24		29.950	67.5	63.5	64.9	S. W.	Clear.	29.986	73.4	81.0	73.2	W.	Clear.	29.970	76.5	87.5	78.0	w. b. s.	Clear.
25		010	68.0	63.0	63.2	Calm.	Clear.	061	73.4	81.0	73.0	N. W.	Clear.	051	76.9	87.2	76.1	N. W.	Clear.
26		076	69.9	61.6	63.8	Calm.	Clear.	30.038	73.0	80.5	72.2	N. E.	Clear.	30.018	76.7	86.7	73.8	e. b. n.	Clear.
27	(	30.018	68.2	63.0	62.5	Calm.	Clear.	086	73.9	80.0	72.1	N. E.	Clear.	060	76.8	84.7	74.5	e. b. s.	Clear.
28		29.970	68.5	63.9	64.8	Calm.	Clear.	006	74.0	81.8	73.2	S.	Clear.	29.980	78.8	83.2	75.2	S. W.	Clear.
29		050	69.2	66.6	67.2	S. E.	Heavy Fog.	29.994	74.8	82.1	74.0	S. W.	Clear.	074	76.6	83.0	75.0	w. b. s.	Clear.
30		30.000	69.0	65.0	65.0	S.	Cloudy partially.	019	73.8	76.8	72.1	w. b. s.	Clear.	30.024	76.8	82.8	74.5	E.	Clear.
31		29.936	69.5	65.8	66.0	N. E.	Cloudy.	29.962	73.5	76.0	70.2	N. E.	Cirro-Strati.	29.948	74.7	77.0	70.7	E.	Cloudy.
Mean.		30.046	63.5	56.9	57.5			30.090	68.3	73.6	67.7			30.061	70.9	78.3	70.0		

Day of the Month.	Maximum Temperature observed at 2 h. 40 m.					Minimum Pressure observed at 4 p. m.					Observations made at Sun-set.					Rain Gauge.				
	Barometer.	Temperature.			Wind. Direction.	Aspect of the Sky.	Barometer.	Temperature.			Wind. Direction.	Aspect of the Sky.	Barometer.	Temperature.			Wind. Direction.	Aspect of the Sky.	Upper.	Lower.
		Of the Mer- cury.	Of the Air.	Of an Evap- Surface.				Of the Mer- cury.	Of the Air.	Of an Evap- Surface.				Of the Mer- cury.	Of the Air.	Of an Evap- Surface.				
1	29.949	66.2	72.9	65.5	89.0	N.	Clear.	29.930	66.2	72.0	65.0	N.	E.	Li. Cirro Str. partially.	29.936	65.5	71.2	61.5	Calm.	Generally Clear.
2	30.071	67.8	74.0	66.5	91.2	N.	Cirro-Strati, (sun-shine)	30.060	67.6	71.5	63.8	N.	E.	Cirro Str. occasional sun-shine.	30.072	67.4	70.0	63.5	N.	Cloudy.
3	114	68.5	73.2	67.0	90.8	N.	Cloudy, (sun-shine.)	092	68.8	73.0	67.0	N.	E.	Cir. Str. partially, (Zen. Cl.)	104	65.0	70.2	64.0	N.	Cirro-strati.
4	052	69.9	77.0	69.9	91.0	N. W.	Cumuli, Zen. Clear.	038	69.9	76.1	68.8	N. W.	Clear.	046	65.2	70.5	65.4	Calm.	Clear.	
5	050	68.8	75.2	63.7	88.5	N.	Clear.	013	69.1	75.5	65.7	N.	Clear.	048	65.0	70.0	65.0	Calm.	Clear.	
6	062	69.0	75.0	65.5	86.0	N.	Clear.	047	68.9	73.8	64.6	N.	Clear.	034	65.5	69.8	64.0	Calm.	Clear.	
7	102	70.3	76.2	65.5	91.0	N.	Clear.	090	70.0	75.0	63.9	N.	Clear.	096	64.9	69.9	63.0	Calm.	Clear.	
8	034	68.5	77.5	67.9	100.0	W.	Clear.	017	68.3	76.2	67.0	W.	Clear.	023	66.0	70.2	61.1	Calm.	Clear.	
9	020	68.5	75.2	65.2	93.0	N.	Clear.	010	68.0	74.6	65.0	N.	Clear.	017	65.8	69.9	64.0	Calm.	Clear.	
10	060	69.0	76.2	67.0	91.0	N. W.	Clear.	048	68.8	75.0	66.9	N.	Clear.	055	65.2	70.6	65.2	Calm.	Clear.	
11	036	69.4	75.2	66.8	87.0	W.	Light Cirro-Strati.	024	69.2	74.9	65.9	N. W.	Light Cirro Strati.	028	65.5	68.9	63.8	Calm.	Clear.	
12	022	68.0	75.8	67.5	90.0	N.	Clear.	017	67.5	71.2	66.9	N. W.	Clear.	023	66.0	70.0	64.0	Calm.	Clear.	
13	055	71.4	81.5	71.0	99.0	N.	Clear.	048	70.7	79.9	70.0	N. W.	Clear.	056	67.0	70.8	66.0	Calm.	Clear.	
14	082	71.2	78.8	67.5	95.2	N. W.	Partial Haze.	077	70.9	78.0	67.0	N. W.	Partial Haze.	088	67.2	69.9	65.5	Calm.	Haze.	
15	025	69.8	79.0	67.2	97.0	N.	Clear.	020	69.9	77.0	66.9	N.	Clear.	024	66.5	69.7	65.8	Calm.	Clear.	
16	29.988	70.4	79.0	67.9	97.0	N. W.	Clear.	29.970	70.3	76.8	66.5	N. W.	Clear.	29.977	66.5	69.0	65.5	Calm.	Clear.	
17	30.016	71.0	81.0	71.5	100.7	N.	Clear.	30.016	71.2	79.0	71.0	N.	Clear.	30.019	66.8	70.1	67.0	Calm.	Clear.	
18	036	71.6	81.5	71.2	103.0	N.	Clear.	030	71.5	80.0	71.0	N.	Clear.	036	67.0	70.8	68.1	Calm.	Clear.	
19	047	70.8	82.0	72.2	104.1	W.	Clear.	042	71.0	80.7	72.0	N.	Clear.	052	67.2	71.0	69.0	Calm.	Clear.	
20	060	73.8	83.9	74.2	106.0	W.	Clear.	051	73.8	81.5	74.0	N. W.	Clear.	060	69.5	71.8	70.4	Calm.	Clear.	
21	030	78.0	85.0	75.5	104.2	S. W.	Clear.	018	77.5	83.0	75.8	S.	Clear.	022	74.1	72.9	71.0	Calm.	Clear.	
22	29.990	75.5	88.2	78.5	115.0	N. W.	Clear.	29.988	75.9	87.0	77.2	w. b. n.	Clear.	29.996	69.5	75.6	72.8	Calm.	Clear.	
23	064	77.4	87.5	77.9	106.0	N. W.	Clear.	054	77.5	86.9	77.5	W.	Clear.	060	75.0	76.1	74.0	Calm.	Clear.	
24	092	79.3	91.5	77.2	108.0	N. W.	Clear.	084	79.0	91.0	77.0	N. W.	Clear.	090	76.9	78.9	74.6	Calm.	Clear.	
25	007	78.3	90.5	78.0	113.7	N. W.	Clear.	090	78.1	90.0	77.5	N. W.	Clear.	090	76.5	78.5	74.0	Calm.	Clear.	
26	050	77.5	88.9	75.5	104.9	N.	E. Clear.	036	77.2	87.5	75.0	e. b. n.	Clear.	038	75.9	76.6	74.1	Calm.	Clear.	
27	080	77.7	87.5	75.3	167.9	e. b. s.	Clear.	061	78.2	86.0	75.2	S.	Clear.	074	75.9	78.8	73.0	Calm.	Clear.	
28	036	79.4	86.0	77.2	106.2	S.	A few detached Cum. to the N.	020	79.0	85.8	76.5	S.	On the Eastern Hor. Cum. Str.	024	77.0	78.0	73.5	S.	Light Clouds to the South.	
29	034	77.9	88.0	77.0	108.0	S. W.	Clear.	020	77.5	86.0	76.6	w. b. s.	Clear.	024	76.6	78.5	73.8	w. b. s.	To the W. & N. W. on the	
30	040	76.9	85.0	74.8	107.0	N.	Clear.	022	76.6	84.5	71.2	N.	Clear.	030	76.0	77.5	73.0	Calm.	Clear. (Hor. Cloudy.	
31	090	75.0	75.5	70.7	.....	W.	Cloudy.	090	74.8	75.5	70.6	W.	Scattered Clouds.	098	74.2	75.0	70.0	Calm.	Scattered Clouds.
Mean.	30.010	72.5	80.8	71.0	95.8			29.999	72.4	79.6	70.4			30.006	69.6	72.9	68.1			



NOTICE.

WE regret much to observe, that several typographical errors exist in this number. The severe Epidemic which has prevailed since our last issue, has seriously interfered with our arrangements, and rendered mistakes unavoidable; delay in publication has proceeded from the same cause.* A list of *Errata* will be carefully prepared for our next number, and the errors we allude to corrected in extra copies of each paper for presentation to the respective authors.

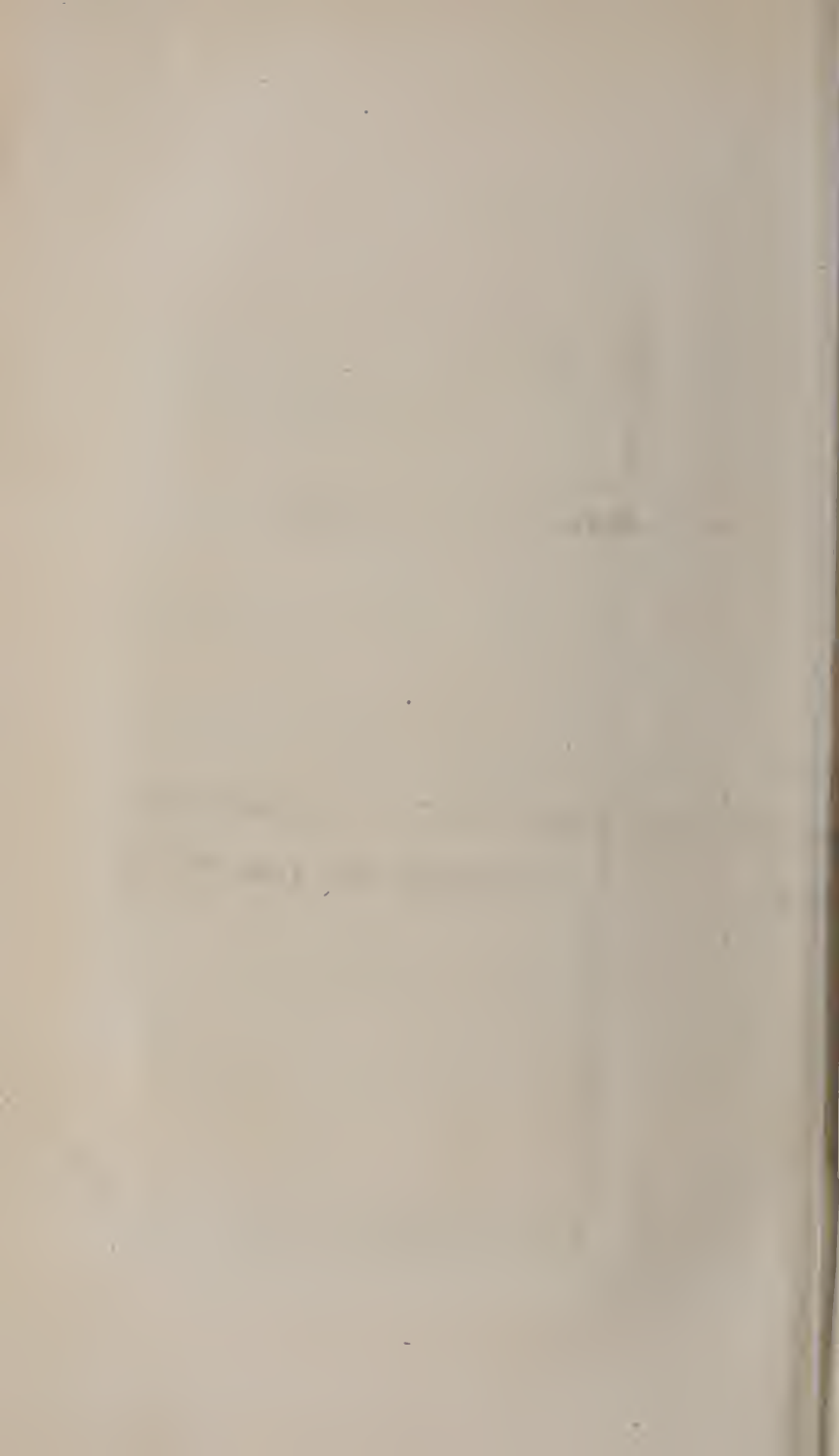
The account of the "Mission to Siam" is from the pen of Dr. RICHARDSON, and will be illustrated by a very large coloured map, now nearly ready.

Our Journal from this day falls under the management of Mr. HENRY TORRENS, Officiating Secretary to the Asiatic Society, and of Dr. O'SHAUGHNESSY, who has retired from the Secretaryship, but continues a Member of the "Committee of Papers." Important improvements are contemplated in the arrangement and selection of Papers, and an increased share of attention will be given to the Departments of Oriental Literature and Antiquities. The Editors rejoice to say, that the periodical still enjoys the liberal support of the Public, and that no diminution has taken place in the list of general subscribers since the commencement of the present series.

9th May, 1840.

* Extract of a note from Mr. Ridsdale, Superintendent of Bishop's College Press.

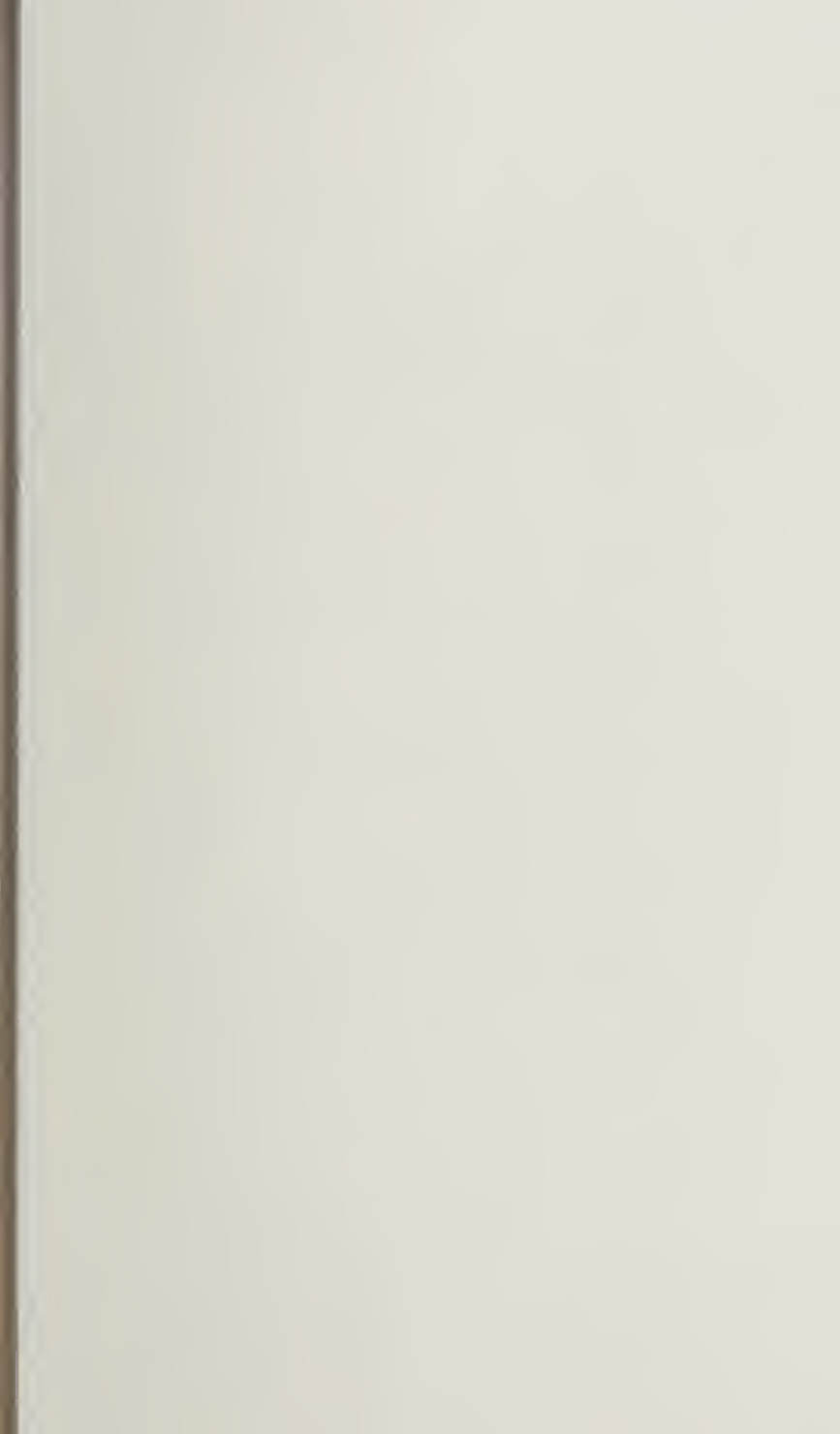
"The last two months have been the most trying I have had in India, one-half and one-third of my office establishment being at times absent from sickness."

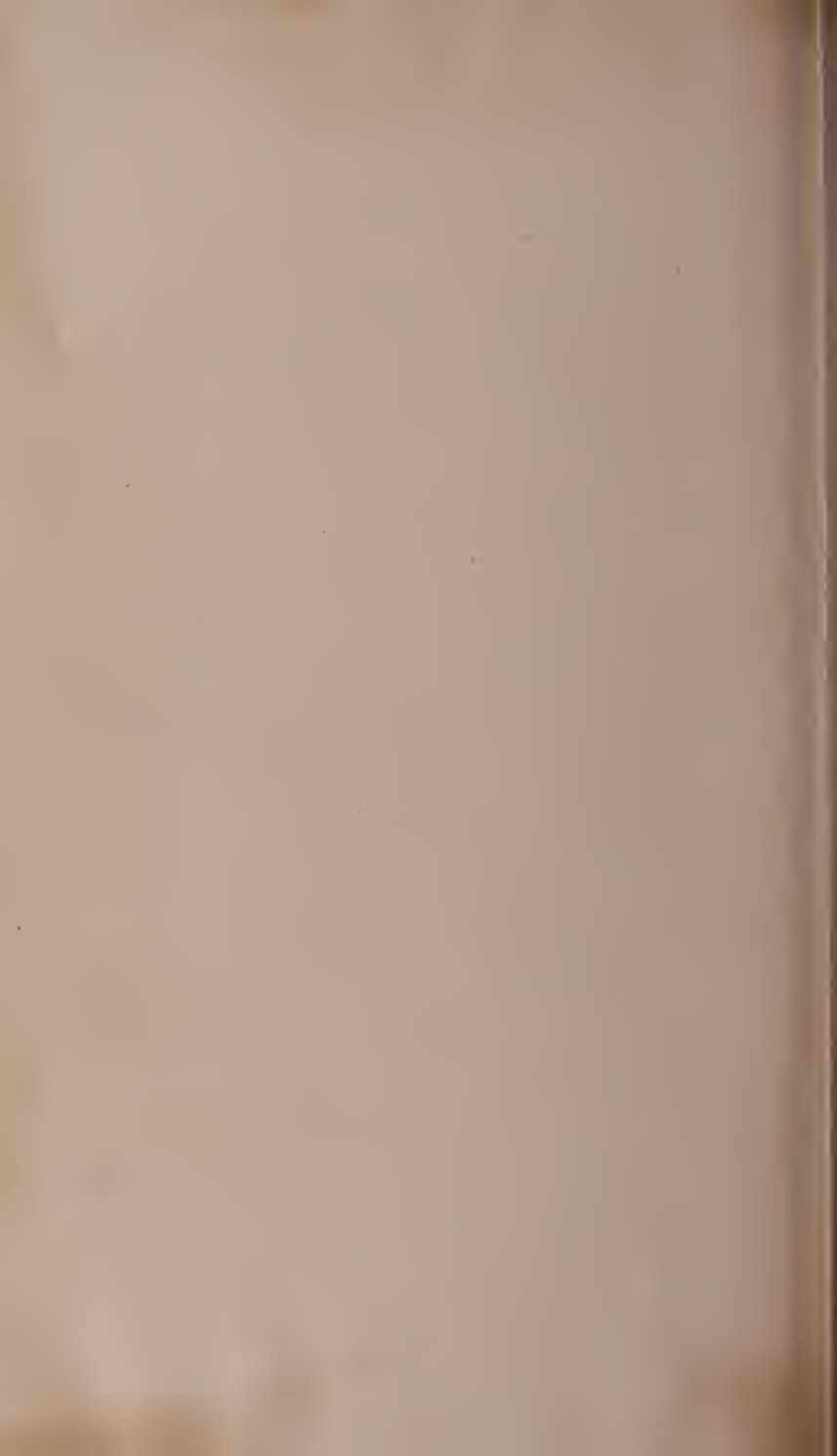


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